

THE IRON AGE

THURSDAY, NOVEMBER 8, 1888.

New Power Presses.

Among new presses recently put on the market by the E. W. Bliss Company, of Brooklyn, N. Y., are the two which we illustrate on this and the next page.

Fig. 1 represents a press, required for drawing up dish-pans, milk-pans, sauce-

think, by reference to the engraving. By means of a special device, the plunger may be lengthened or shortened very quickly, while the outer slide or mandrel is provided with means of adjustment, as shown by engraving.

The press is driven by pulleys, 24 inches by 6 inches on the back shaft, on which is

a very powerful machine, in compact form, occupying, as it does, a comparatively small floor space. A feature of interest to users is the adjustable table, to which the die, or lower knife for shearing, is secured. It has an adjustment of 9 inches in height, allowing a clear space between table and slide, varying from 4 to 13 inches, thus

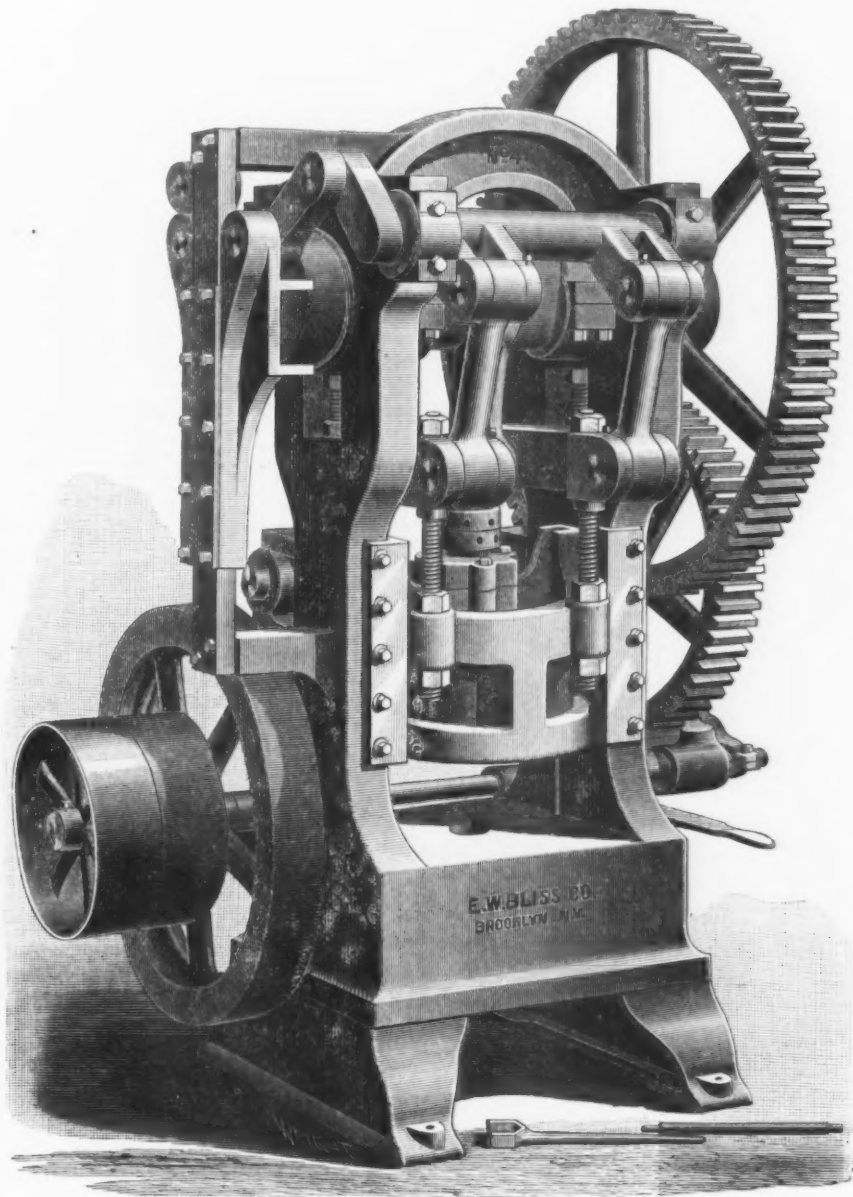


Fig. 1.

SHEET-METAL DRAWING PRESS, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

pans, trays, some articles of brass and copper, deep ironware, &c., &c. The main feature of this machine is the novel arrangement of links in connection with rock-shafts and slide, by means of which the blank holder or outer slide is pressed down, and remains stationary during a sufficient part of a revolution of crank to permit the plunger to descend and draw the blank into shape before releasing its hold and rising. A crank pin in the disk on the outer end of the shaft carries the slide attached to it up and down at every revolution of crank, thus operating the links and rock shafts above mentioned. This action will be clearly understood, we

mounted a fly-wheel 45 inches in diameter, and weighing 900 pounds, to give steadiness of motion. The large gear is 60 inches in diameter, and the proportion through the intermediate gearing, between it and the pinion on first shaft, is 28 to 1. All other parts of the machine are correspondingly strong, making it a very powerful press, suitable for making deep stamped ware requiring a blank not exceeding 26 inches in diameter; the finished work not exceeding 20 inches in diameter, nor 6 inches in depth. The weight, complete, is 21,000 pounds.

Fig. 2 illustrates a punching and shearing press. The design is such as to make

adapting it for a large variety of work not usually accommodated in a press of this kind. Any size opening may be cored in the table, not exceeding 6 x 10 inches, or 6 inches round. Two large holding bolts, one on each side of the table near the top, secure it firmly in position against the front of the press frame, while a projecting arm, or lug, cast on the under side of the table, rests on a large adjusting screw, as shown in the cut, giving ample support for the heaviest kind of cutting. For much of the work which this machine is adapted no gearing is required; a fly-wheel, 54 inches in diameter, weighing 1300 pounds, mounted on a shaft

where the gear is shown, giving ample power. But for very heaving cutting or punching, a 5-foot spur-gear is used, with pinion, making the proportion of gearing $7\frac{1}{2}$ to 1. This is driven by tight and loose pulleys, 24 x 5 inches, with a 36-inch fly-wheel, weighing 700 pounds, to give steadiness of motion. The slide has a 2-inch stroke, working in adjustable bearings. The machine throughout is built of the best material and workmanship, making it a desirable tool for manufacturers of iron and steel goods, iron railings, architectural ironwork, agricultural implements, &c., &c.

Deep Stampings.—The great superiority of stampings over built-up articles in metal is too well known to need to be

water tight without solder. The top of the can is closed with Griffin's lever opening lid, which also makes an air-tight joint by mere contact. It is proposed to make cans of large size by this process and to line them with enamel for the storage of many articles of food.

Preserving Exposed Ironwork.

A recent issue of *Industry*, of San Francisco, Cal., contains the following under the above head:

John Heald, the proprietor of the machine works at Crockett, Contra Costa County, has for some years past been experimenting with a view to preserving exposed ironwork, and has demonstrated some things respecting this important

pentine and white lead mixed thin, the very pores of the iron are closed. The interstices, to so call them, are too minute to receive the body which oil gives, but are closed by the thinner compound. This is the theory, but that is a matter of no consequence so long as the fact is known.

We recommend experiments with this method of protecting iron, an account of which we publish at Mr. Heald's suggestion, and any further information will no doubt be furnished if application is made to him. The preservation of surfaces beneath the light coat of a shipping mark is something which most every one has observed but never thought of as differing from the effect of common paint mixed with oil. The process will be an impor-

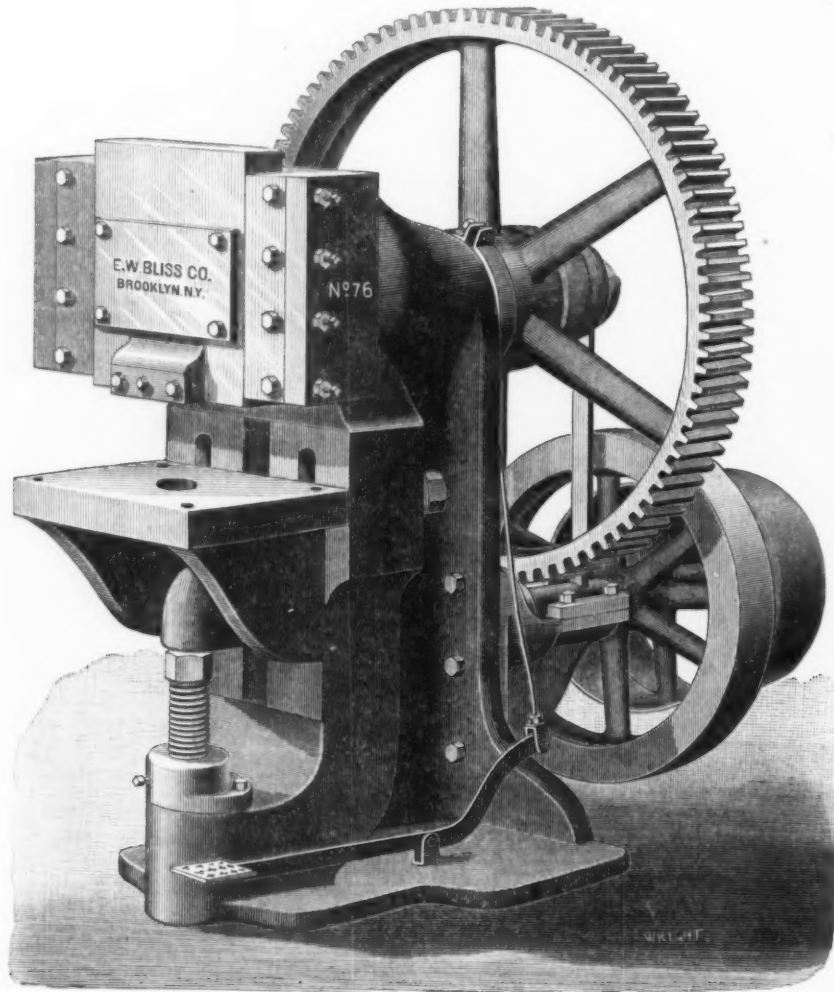


Fig. 2.

PUNCHING AND SHEARING PRESS, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

insisted upon. In cans for containing preserved provisions there is the additional advantage that when stamped there is no need to use solder in the internal joints, and hence the chance of lead poisoning is entirely removed. But deep stampings are very expensive to make, and a limit is soon reached beyond which the metal cannot be got to flow. To meet this difficulty Mr. Featherstone Griffin, of the Self-Opening Tin Box Company, has, according to *Engineering*, devised a method of building up stampings without solder. The bottom of a can or cask is stamped with a part of the cylindrical wall in the usual way; the remainder of the can is formed of similar stampings with the bottom cut off, leaving them short cylinders. The end of one cylinder is placed within the end of the next, and the joint is then passed between rolls, which corrugate it and make the union perfectly air and

matter that may be of great value. Mr. Heald some years ago had occasion to move a gas holder at Vallejo, and happened to notice on the old plates, which were badly corroded, that the "shipping marks" on the sheets were perfectly preserved. This led to the examination of other cases of the kind where marking had been done on ironwork, and also to experimenting with turpentine and white lead as a first coating to prevent rust. It is found that when surfaces are coated with finely ground lead thinned with spirits of turpentine, no corrosive action or scaling takes place, even when heavy coats of paint are afterward put on the outside. Mr. Heald says that common paint mixed with oil is too thick to penetrate or close the imperfections of the surface and penetrate beneath the scale where it exists, thus leaving places for corrosion to begin beneath the paint. With tur-

tant one for iron vessels, above water at least. The wash can be quickly put on, and will dry in a short time.

The city's rights in relation to wharf property having been more distinctly defined by the Court of Appeals, in the case of Wm. H. Kingsland, Mayor Hewitt recommends that measures be taken for completing the Dock Department's plan for the general improvement of the water front and the increase of wharfage facilities on both rivers.

Denver, Col., will soon have one of the finest Masonic temples in the West, costing not far from \$250,000. It will be seven stories high with a frontage of 125 feet and a depth of 100 feet. Every girder and beam throughout the building will be of iron, not even a wooden step or staircase being used.

Improvement of the Steam Engine.

In a paper entitled "The Distribution of Internal Friction of Engines," presented at the recent meeting of the American Society of Mechanical Engineers, Prof. Robert H. Thurston gave at length the results of a series of interesting tests made at different times with the view of correctly apportioning this friction. To the means employed for this purpose we have already briefly referred in our first report of the meeting. The plan, it will be remembered, consisted in first determining the whole friction of each engine tested, and then dismantling the engines, part by part, driving the connected parts by a pulley and belt from a line of shafting through a carefully standardized transmitting dynamometer.

Without going into all the details of the paper, it is of interest to note the conclusions at which Professor Thurston arrives. The improvement of the steam engine, he says, has to-day reached a point beyond which, in its thermodynamic relations, but little advance can be anticipated. Under usual conditions of operation of our very best engines, they are so near the efficiency of the ideal engine, working under precisely similar conditions, that the range of possible gain left to us is too small to permit us to look in that direction for rapid or important changes in further increase of efficiency and economy. Where the ideal engine would consume 10 pounds of steam per horse-power per hour, we have actually reached as little as 14, if the latest and best reports of the best of modern engines may be accepted as substantially correct; and even this 30 per cent. margin is reduced by practical conditions restricting expansion. If it were to be asserted that we may hope to bring the consumption of steam in good engines of the best type down to as low as 12 pounds per hour per horse-power, it is probable that the most experienced and best informed engineers would think it a somewhat rash statement; but that is what the tendency and rate of recent improvements would seem to promise for the immediate future, assuming that no very great increase in pressures and temperatures of steam may be expected. Practically, also, it is now known that the highest duty is not the most desirable, nor, on the whole, the most advantageous, condition of operation of the engine, and we are restricted to lower duties and reduced efficiencies whenever we consider financial relations. It is, nevertheless, the fact that the conditions of improvement are those which also give higher ratios of expansion for the best point of cut-off and most advantageous ratios of expansion. The duty to seek further means of improvement and higher efficiency becomes all the more imperative when we study the practical conditions under which our engines must be employed. Having, however, as just remarked, so nearly reached the limit of possible gain on the thermodynamic side, it becomes advisable to seek the more carefully for opportunities of improvement in other directions. We have, in the work outlined in this paper, both the directions shown us and the specific method of procedure suggested.

The real, final efficiency of the steam engine, or of any heat engine, is composed of the resultant of several distinct efficiencies, as the thermodynamic efficiency, the efficiency of the engine as a heat preserver and user, the efficiency as a machine, and the efficiency of a whole considered from a commercial standpoint. Of these several efficiencies we have the means of studying the efficiency of the machine as a division of the whole within which to seek the best means of securing a gain of total efficiency. The real and final efficiency is certain to be increased if we can effect an

improvement at this point, whatever the extraneous conditions of operation. Finding little chance of gain thermodynamically, it becomes our duty to ascertain what are the probabilities of securing progress elsewhere. It is at once seen that the difference here between the real and the ideal engine is greater than in the domain of thermodynamics, the best cases being in both instances taken. Those engines which are most nearly perfect thermodynamically are undoubtedly often least perfect, or at least of the least perfect types, when the efficiency of the engine as a machine is studied. Few of them have less than a total of 20 per cent. friction, while they are sometimes probably nearer the ultimate limit of improvement, practically, as converters of heat into work. We are now, for the first time in the history of the theory of the steam engine, in a position to say just where the losses of the machine are in detail, how we are to endeavor to reduce them, in what degree we may hope for such gain, and where it is to be found if effected at all.

The first and most remarkable fact to be noted is the extraordinary amount, absolutely and relatively, of the friction of the crank shaft. This amounts to nearly one-half of the whole waste, and to from 5 to 10 per cent. of the whole power of the engine, in the cases here examined. It is remarkable not only for its amount, but also because of the fact that we had begun to believe that, under similar conditions of pressure, speed of rubbing, and of lubrication, it was perfectly practicable to bring down the coefficient to less than 1 per cent. and perhaps to as little as one-tenth of 1 per cent. However, we find that this coefficient rises, in the unloaded engine, to about 0.30 as a maximum, and, as a minimum, to at least 0.09; while it only falls 0.04 in the best case, with the increase of pressure on the bearings due to full load and power. This is the more astonishing when it is considered that, on the axle of the car-wheel, it has been found often that the friction is a fraction of 1 per cent. and often as low as one-tenth per cent. Here is evidently the first place in which to seek further improvement. If this item can be brought down as low as in car-axle journals, the efficiency of the engine as a machine will be increased by about 5 per cent. in the very best cases, and by 10 per cent. in ordinary engines. How this is to be done can be best ascertained when it is found just what are the causes of this extraordinary and previously unsuspected loss. The only conditions apparent tending to aggregate this waste are the continuous rotation in one direction and the uninterrupted pressure of the journal in its bearing. It would appear probable that it is a case of commonly imperfect lubrication. Could the oil-bath system in method and in results be secured here, it would seem probable that the friction might be enormously reduced. It would, even in many cases, if not in all, pay well to have a thoroughly reliable system of lubrication by means of a forcing pump that should insure the support of the journal upon a cushion of lubricant, thus making its action analogous to that of the "*palier glissant*" of Giffard and the "*water bearing*" of Shaw and of others.

The second and most obvious conclusion is that the valve should be balanced and so connected as to cause the least possible waste by friction through its motion or that of its moving connections. There is evidently no probable line of improvement so certain to yield a large and profitable result as this. The balancing of the valve has been accomplished, and frequently, during many years past, so successfully that there is no excuse for neglecting this point in even the cheapest classes of engines. No engine can be considered as belonging to the best class which is not either pro-

vided with a balanced valve or which has not a system of valve gear, as with some of the "drop cut-off" engines, in which the loss in this direction is rendered insignificant. Here lies an opportunity to raise the efficiency of mechanism of ordinary engines at least 5 per cent., and of the best of engines with unbalanced valves 2 or 3 per cent. It is evidently better, in many cases, to have a valve which is balanced, though slightly leaky at times, than to use an unbalanced valve, though absolutely tight at all times. The simple fact, here revealed, that nine-tenths of this friction may be avoided is very important.

The third item in order of importance is the friction of piston and its rod. This is as great as that just referred to, and is vastly more variable with the class of engine, and probably in the same engine with differences in handling, and especially in setting up packing and springs, where they exist. The writer has often known the power of an engine to be sensibly affected by the carelessness or inexperience of the attendant, who had screwed up his packing in the rod stuffing-box too tightly, and has, on more than one occasion, had a similar experience where the rings were set out too hard. The metallic packings and the unpacked pistons and rods now coming slowly into use will unquestionably do much to remedy this defect of the average engine. Meantime, with the older design, it is perfectly possible to keep piston and stuffing-box tight without wasting much power or by slowing down the engine by conversion of heat into work at points where the operation is likely to produce serious harm as well as waste. Rings are much oftener too tight than too loose, and a stuffing-box should only be set up when the engine is running, and then only with fresh packing and not more than is sufficient to check any visible leakage. New packing in a well-made box never needs much compression, and when it becomes necessary to screw it down hard it is time to replace it by new. Any packing that compels severe compression when new should be promptly condemned.

The remaining items are of minor importance as bearing upon the efficiency of the machine, and they are all obviously easily taken care of by a good designer and a good engineer in charge. Here, if anywhere, it is the fact that freedom of lubrication is the essential consideration, and the more nearly most absolutely flooded the parts can be, and the more absolutely certain lubrication can be made, the better, and irrespective, also, to a great extent, of the cost of the lubricant. Any lubricant freely used can be filtered and cleansed in such manner and so effectively that its more or less free supply to the bearing is a matter of no consequence as a matter of first cost; while the cost of wasted power and fuel, and of repairs due to excessive friction and wear, will usually enormously exceed any apparent gain in that direction.

Slipping of Locomotive Drivers.—Mr. M. U. Forney, in the *Railroad and Engineering Journal*, says that the force required to make locomotive driving-wheels slip will vary very much with the condition of the rails. If they are quite dry and clean it will require a force equal to about one-fourth the weight on the wheels. That is, supposing we have a wheel attached to a frame which is fastened so that it cannot move, and that the wheel rests on a rail and is loaded with, say, 12,000 pounds, if a rope or chain could be attached exactly at the tread of the wheel, and carried over a pulley, then it would require a weight of about 3000 pounds attached to the end of the rope to make the wheel slip. If the rails were sanded, the adhesion would be somewhat greater, and if they were wet or muddy or

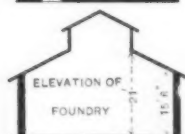
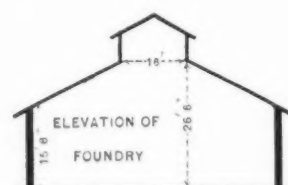
greasy, considerably less. The proportion of the adhesion to the weight in the driving-wheels is about as follows: On dry-sanded rails it is equal to one-third. On perfectly dry rails, without sand, it is one-fourth. Under ordinary conditions, without sand, or on wet-sanded rails, one-fifth. On wet or frosty rails, one-sixth. With snow or ice on the rails, the adhesion is still less. Of course the total weight on all the driving-wheels must be taken in calculating the adhesion. Thus, if a locomotive has four driving-wheels, and each one of them bears a load of 12,000 pounds, then the total weight on the driving-wheels, or adhesive weight, as it is called,



New Works of the Stover Mfg Co.

The interest which is so generally expressed in the plans of new manufacturing establishments, designed for a special class of work, will sufficiently explain our reasons for giving space to the accompanying engravings relating to the works of the Stover Mfg. Company, of Freeport, Ill., manufacturers of special machinery and agricultural implements.

The buildings have just been completed, and embrace what is probably one of the most complete foundries for small articles west of Buffalo. The main building is 458 feet long, 40 feet wide and two stories high, with an "L" 106 feet long, 40 feet wide, two stories high. The foundry attached thereto runs parallel with the main building, and measures 148 x 58 feet. The large foundry for making light gray iron castings measures 250 x 60 feet, and is used entirely on contract work, mostly hardware specialties. The company make several hundred tons of light gray iron castings annually on outside orders besides



will be $12,000 \times 4 = 48,000$ pounds, and the adhesion will be 9600 pounds.

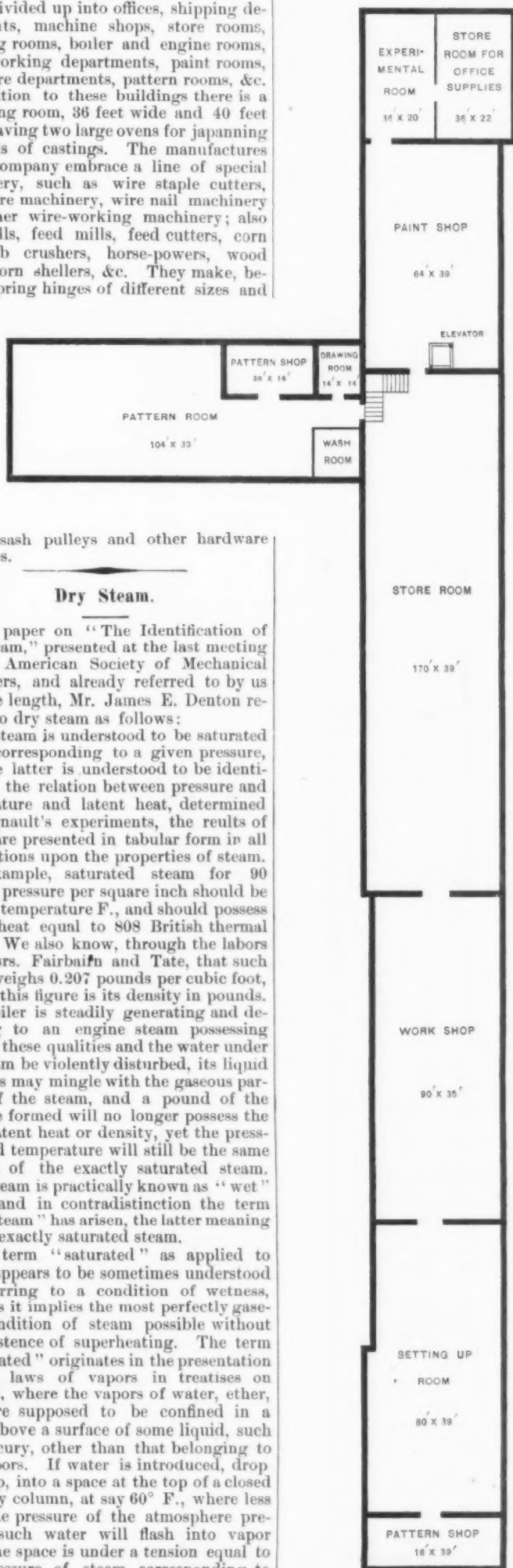
The falling off in the business of the New York Stock Exchange is illustrated by the following figures: In the first 10 months of 1887 72,253,370 shares of stock were sold, having a par value of \$6,313,396,325 and an actual value of \$3,845,025,768. In the same period this year the sales were 53,459,759 shares, with a par value of \$4,633,801,425 and an actual value of \$2,870,081,762.

Kansas City manufacturers, favored by shorter railroad connections, have formed a syndicate to engage in direct trade with Mexico

Fig. 1.—General Ground Plan.

NEW WORKS OF THE STOVER MFG. COMPANY, FREEPORT, ILL.

doing their own work. The main building is divided up into offices, shipping departments, machine shops, store rooms, finishing rooms, boiler and engine rooms, wood-working departments, paint rooms, hardware departments, pattern rooms, &c. In addition to these buildings there is a japanning room, 36 feet wide and 40 feet long, having two large ovens for japanning all kinds of castings. The manufactures of the company embrace a line of special machinery, such as wire staple cutters, barb wire machinery, wire nail machinery and other wire-working machinery; also windmills, feed mills, feed cutters, corn and cob crushers, horse-powers, wood saws, corn shellers, &c. They make, besides, spring hinges of different sizes and



styles, sash pulleys and other hardware novelties.

Dry Steam.

In a paper on "The Identification of Dry Steam," presented at the last meeting of the American Society of Mechanical Engineers, and already referred to by us at some length, Mr. James E. Denton referred to dry steam as follows:

Dry steam is understood to be saturated steam corresponding to a given pressure, and the latter is understood to be identified by the relation between pressure and temperature and latent heat, determined by Regnault's experiments, the results of which are presented in tabular form in all publications upon the properties of steam. For example, saturated steam for 90 pounds pressure per square inch should be at 320° temperature F., and should possess latent heat equal to 808 British thermal units. We also know, through the labors of Messrs. Fairbairn and Tate, that such steam weighs 0.207 pounds per cubic foot, or that this figure is its density in pounds. If a boiler is steadily generating and delivering to an engine steam possessing exactly these qualities and the water under the steam be violently disturbed, its liquid particles may mingle with the gaseous particles of the steam, and a pound of the mixture formed will no longer possess the same latent heat or density, yet the pressure and temperature will still be the same as that of the exactly saturated steam. Such steam is practically known as "wet" steam, and in contradistinction the term "dry steam" has arisen, the latter meaning simply exactly saturated steam.

The term "saturated" as applied to steam appears to be sometimes understood as referring to a condition of wetness, whereas it implies the most perfectly gaseous condition of steam possible without the existence of superheating. The term "saturated" originates in the presentation of the laws of vapors in treatises on physics, where the vapors of water, ether, &c., are supposed to be confined in a space above a surface of some liquid, such as mercury, other than that belonging to the vapors. If water is introduced, drop by drop, into a space at the top of a closed mercury column, at say 60° F., where less than the pressure of the atmosphere prevails, such water will flash into vapor until the space is under a tension equal to the pressure of steam corresponding to 60° temperature. Then if more water be introduced into the space, it refuses to

vaporize, but accumulates as liquid water on the surface of the mercury, and consequently the space, and hence the vapor in that space, is said to be "saturated." Before the space or vapor is thus saturated the vapor of water present is "non-saturated" steam, and, if compressed, its pressure increases without causing any liquefaction, the vapor following the laws of fixed gases, like air, &c. When the space or vapor becomes saturated any compression of the vapor does not result in increased pressure (the temperature being assumed constant), but instead some vapor liquefies. Similarly the steam in a practical boiler (where there is always liquid water beneath the steam) is saturated, because any effort to make a given weight of steam occupy less space, either by raising the water level or by other compression of the steam, causes a portion of this weight of steam to liquefy without changing the vapor tension, assuming the temperature of the contents of the boiler to remain constant. The only practical at all condition corresponding to "non-saturation" as described in physics is when steam is superheated. If a sufficient portion of the heating surface of the boiler above the water line be exposed to the action of the fire, the pressure of the steam may remain the same, and yet its temperature may be greater, the latent heat greater, and the density less than corresponds to saturated steam. Such steam is practically known as superheated steam.

In measuring the performance of a boiler the essential determination is the quantity of heat utilized by the generation of steam. If the steam generated at say 90 pounds pressure is dry steam, then for each pound of feed water the boiler is to be credited with utilizing 120 heat units, due to the temperature of the steam if the feed water is at 200° F., and 808 heat units due to its latent heat, or a total of 928 heat units. If, however, 10 per cent. of the steam is liquid water mechanically mixed with 90 per cent. of dry steam, then for each pound of feed water the boiler is to be credited with 1.10 x 120 heat units, due to temperature, and 0.90 x 808 heat units, due to latent heat, or a total of 859 heat units, which is 92 per cent. of the dry steam total. Unless, therefore, allowance for the presence of moisture is made, the efficiency of a boiler is made too great for ordinary steam pressures, at the rate of $\frac{1}{16}$ per cent. for each 1 per cent. of water in the steam. Again, if steam at 90 pounds pressure is superheated 10° F., so that its temperature is 330° F., then for each pound of feed water at 200° F. we must credit the boiler with the heat due to dry steam plus $0.48 \times 10^\circ = 4.8$ heat units, so that failure to allow for superheating makes the efficiency of a boiler, at ordinary pressures, too low by about 0.05 per cent. for each degree F. of superheating.

It is customary among experts to make these allowance in reporting the performances of boilers, and hence arises the necessity of determining to what extent the steam generated by a given boiler differs from exactly dry steam. If the steam is superheated, the simple observance of its temperature by a proper thermometer affords the desired data. If, however, the steam is shown by a thermometer to be at exactly the temperature due to saturation, it may contain any amount of water in suspension, and the determination of the amount of the latter can in general only be accurately known by a measurement of either the latent heat or density of a known weight of the mixture. The determination of the density is an operation too delicate to have been yet attempted with portable apparatus. The determination of latent heat involves simply the condensation or mixture of a known weight of steam in or with a known weight of some other substance of known specific

Fig. 2.—Second-Floor Plan.

heat, and the operations to be performed are such as can be carried out with apparatus of a convenient portable nature.

Recent Legal Decisions.

PARTNERSHIP.

A firm engaged in making agricultural implements organized itself into a corporation to conduct a like business, and the members of the firm each were to get the value of their interest in stock. C's portion was \$20,000 of the capital stock, \$17,500 of which he sold or exchanged for a house and lot. Before the change was fully carried out C. died, and on the distribution of the stock \$17,500 were delivered to the grantor of the house and lot and \$2500 to the executors of C. When the corporation was created the members of the firm considered it entirely solvent, but it turned out that it was, at that time, unable to pay its debts, and S., N. & Co., Limited, a creditor of the firm, sued the executors to compel the application to the payment of its demand of the \$2500 of stock, and of the property conveyed for the \$17,500 of the stock. Individual creditors of C. were made parties to this suit—Singer, Nimick & Co., Limited, *vs.* Carpenter—and they contended that the partnership creditors were not entitled to a preference on the stock distributed to C. The trial court decided against the S., N. & Co., and the intermediate court affirmed the judgment, but a further appeal was made to the Supreme Court of Illinois, where the S., N. & Co. were again defeated. Judge Scholfield, in the opinion, said: "The law does not recognize that the creditor of a firm has a superior equity to that of the individual creditor of a member of the firm for payment from the partnership's assets. It recognizes, however, that the members of the partnership have a superior lien on the partnership property for the payment of the firm debts, and allows the creditors to avail themselves of this lien, to the exclusion of individual creditors, where it has not been surrendered to the partners. The other partners here having joined with the deceased partner in the contract to form the corporation, and distribute the stock therein in the proportion of their respective interests are, of course, concluded by it if he was bound. While that contract did not vest a present title, it vested a right in the corporation to have it performed, and, by reason of the peculiar property to be transferred—partly real and partly personal—and the personal property having its peculiar value by reason of its adaptation to use in connection with the use of that realty, an equity vested in the corporation to have that particular property, and a Court of Chancery would therefore have decreed a specific performance of the contract at the instance of the corporation, it not being in default. It would, moreover, seem that as the money the S., N. & Co. are claiming to appropriate is money derived from subsequent sales of the stock of the corporation, that, of itself is sufficient to deny its right to it. The stock was not partnership property, and its proceeds cannot be. If the partnership property did not vest in the corporation pursuant to the contract, it is just as it was before the attempted transfer, and the firm creditors may resort to it; and if the corporation issued stock to the individual for which it had not been paid, and to which the individual was not entitled, the loss is manifestly upon the corporation, and not upon the creditors of the firm of which the individual was a member. But if the partnership property did vest in the corporation, the interest of the partners in it was thereby terminated, and with their interest terminated that of the firm creditors.

In equity it was a conversion of partnership property into individual property as of the date of the contract."

RESTRAINT OF TRADE—CONTRACT TO CONTROL THE MARKET.

A lumber corporation made an agreement with two persons who were manufacturers of lumber in Santa Cruz County, Cal., by which they were to supply them 2,000,000 feet of lumber during the year, at \$11 a thousand, and these persons stipulated that they would not make any lumber to be sold during the year, in the counties of Monterey, San Benito, Santa Cruz and Santa Clara, except under this contract, and as a penalty pay \$20 a thousand for any lumber made and sold in these counties to other persons. The contract was not carried out, and the corporation sued for damages. In this case—*Santa Clara Valley Mill and Lumber Company vs. Hayes*—the court found that the contract sued upon was made for the purpose of limiting the supply of lumber made in these counties, and to increase the price of it in the State under a combination among all the lumber dealers in or near Felton, in Santa Cruz County, to control the lumber market for the year, and that the contract was void, as against public policy, it being in restraint of trade. The defendants had judgment, and plaintiff carried the case to the Supreme Court of California, where the plaintiff was again defeated. The Chief Justice (Searles), in the opinion, said: "When there is fraud or mistake in a contract the parties to it may have relief for the personal injury, but when it is an illegal contract society is injured, because the motive of wrong-doing in it is far-reaching. This illegality may be in the consideration, or in the promises and stipulations of the agreement. Among the contracts illegal under the common law, because opposed to public policy, were contracts in general restraint of trade—contracts between individuals to prevent competition, and keep up the price of articles of utility. In a New York case—*Arnot vs. Coal Company*—it was found that the contract involved therein limited the mining of coal at a certain colliery at Pittston, Pa., for the purpose of controlling the supply of coal for the market at Elmira, N. Y. The defendant was the head of a combination to effect this end, and it refused to pay the Pittston Company for coal delivered to it under the contract, upon the ground that it had sold coal to other parties, in violation of its agreement. Arnot became its assignee, and sued for the coal delivered. The New York Court of Appeals, in declaring the contract invalid, said: 'A combination to effect such a purpose as this is inimical to the interest of the public; all contracts designed to effect such an end are contrary to public policy, and therefore illegal, as is well settled by adjudicated cases. Every producer or vendor of coal or other commodity has the right to use all legitimate efforts to obtain the best price for the articles in which he deals, but when he endeavors to artificially enhance prices by suppressing or keeping out of the market the product of the labor of others, and to accomplish that purpose by the means of contracts binding such other persons to withhold their supply, such restraints are even more mischievous than combinations not to sell under an agreed price. Combinations of that character have been held to be against public policy, and illegal.'"

It is a remarkable roll of munificent bequests that John Guy Vassar, of Poughkeepsie, has left. He has bequeathed \$250,000 to a hospital, \$100,000 to an orphan asylum, \$65,000 to an aged men's home and \$145,000 to educational institutions, besides large sums to other objects.

The Lebel Rifle.

In a recent issue we referred briefly to the fact that the extreme curiosity which has been manifested for some time past as to the construction of the Lebel rifle, of which 350,000 are now being issued to the French army, had, in a measure, been satisfied by the publication, through the French Minister of War, of illustrations and a description of the weapon in *Instruction sur l'armement de l'infanterie*. We take pleasure in reproducing the engravings in this issue, being indebted for the particulars to the London *Engineer*.

The weapon is really a modification of the Gras rifle of 1885, which, in its turn, was a modified Kropatchek, in use in the French Navy since 1878. The principal modification is in the caliber, which has been reduced from 0.472 inch to 0.315 inch. The diminished weight of the weapon and its ammunition is a matter of very great importance, while the new powder employed renders, it is claimed, the small bore bullet as efficient as the large bore was with ordinary powder. A further improvement has been effected in the block which takes the force of recoil, which now works on two tenons, instead of as hitherto being supported only on one side.

The magazine is parallel with the barrel. In it the cartridges are placed end to end. A spring with a button on the end forces the cartridges toward the rear into a species of spoon, A, by which the cartridge is raised into such a position that it is readily thrust forward into the chamber by the action of the sliding breech block C P. A detent, G, prevents the next cartridge from finding its way under the spoon. By means of the thumb button L the repeating mechanism can be locked, and the rifle can then be fired as an ordinary breech-loader.

Fig. 1 is an elevation showing the rifle with the breech closed, ready for firing. Fig. 2 is a top view. Fig. 3 shows the rifle in section with the breech block open; an empty cartridge is still in the jaws of the extractor ready to be thrown out at the top. In Fig. 4 the cartridge has been ejected and the spoon contains a cartridge ready to be pushed into the chamber by the act of closing the breech. The locking and percussion mechanism are identical with those of the Gras rifle. The new weapon measures all over, with its sword bayonet, 4 feet 3 3/4 inches, and weighs 9 1/2 pounds with eight cartridges in the magazine.

The proposed Congress of American nations in 1889, for the purpose of adopting a uniform system of weights and measures, a common silver coinage, laws for the regulations of patents, copyrights, trade-marks, &c., and an equitable method of settling all international disputes, is regarded by not a few as claiming an importance that can hardly be overestimated. With impending strikes and certain branches of trade paralyzed by over-production, it is inexplicable that our manufacturers should not have made greater efforts to compete with the English, French and Germans, in Spanish-America, a market which, geographically considered, we should easily control. If time ever becomes an item of value to our easy-going Southern neighbors, our share of this enormous and highly lucrative commerce should speedily rise above the shameful and meager tenth, with which we seem at present contented, and our merchandise should be carried, too, in American ships.

At Columbus, Ohio, November 1, the works of the Columbus Bridge Company were destroyed by fire. Loss is estimated at \$20,000, of which \$15,000 is on machinery.

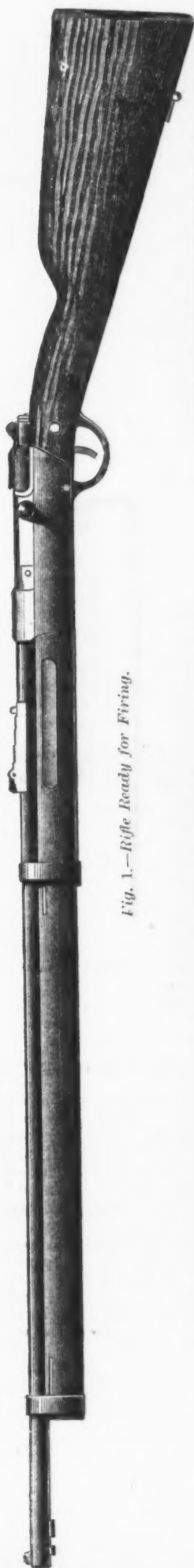


Fig. 1.—Rifle Ready for Firing.

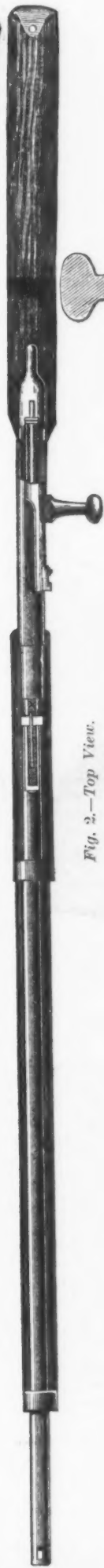


Fig. 2.—Top View.

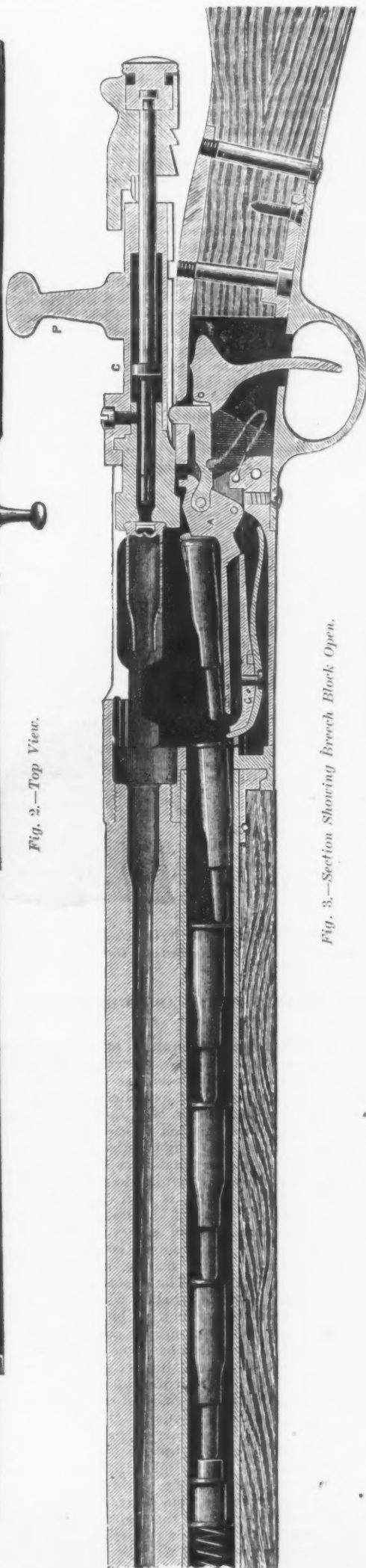


Fig. 3.—Section Showing Breech Block Open.

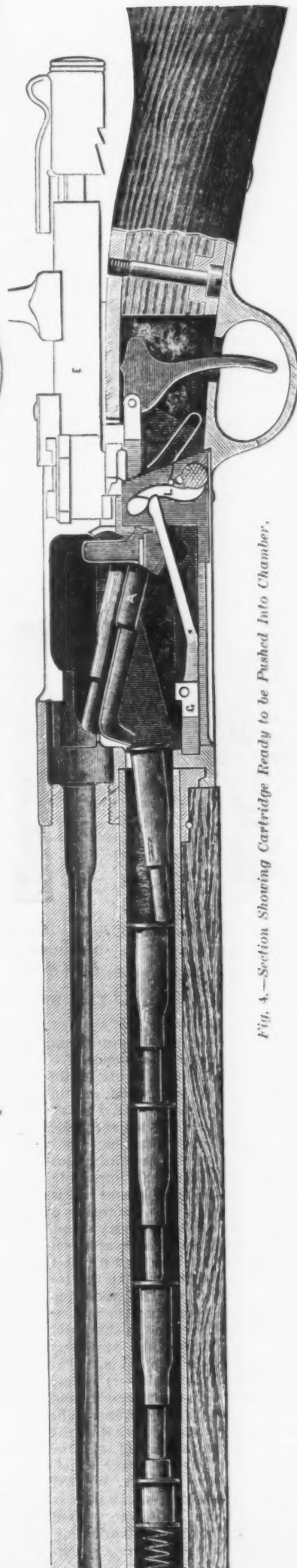


Fig. 4.—Section Showing Cartridge Ready to be Pushed Into Chamber.

THE NEW RIFLE FOR THE FRENCH ARMY.—THE LEBEL MAGAZINE RIFLE.

Incandescent Gas Lighting.

Of the new fields of usefulness for gas companies which have been developed since the introduction of the electric light first threatened to seriously affect their business, that of incandescent gas lighting has been watched with no little interest, and now seems to offer every promise of commercial success. Incandescent gas lights, so-called, from the start appeared to be of a character which would enable them to successfully compete with electric lamps of the incandescent type, and, while some of the early attempts at putting them into use were not in all respects successful, the results indicated pretty clearly what might be ex-

pected of them with the improvements suggested by even a brief experience. Probably one of the first lights of this class shown in practical work in this country was that devised by Mr. Fahnehjelm. It was exhibited, as we remember it, somewhat over three years ago, at a New York meeting of the American Institute of Mining Engineers, and apparently demonstrated that the problem of utilizing the great intensity of combustion of water-gas could be solved in a very simple manner. Mr. Fahnehjelm's apparatus consisted essentially of an iron frame placed over an ordinary gas burner. In the top of this frame, so arranged that the flame from the burner impinged upon them, were two parallel rows of needles, a short distance apart and looking like two very coarse combs placed side by side. The needles consisted of magnesia very highly compressed under hydraulic pressure and then baked at a high temperature. The heat of the burning water-gas caused the needles to become incandescent, and the resulting light, in every way equal, and in some respects superior, to that from an electric incandescent lamp, was naturally much more satisfactory than that supplied by ordinary illuminating gas. The magnesia needles were adjust-

able and could be raised or lowered according to the size of the water-gas flame and the degree to which they became worn by the intense heat. As to the cost of the light—an important consideration—it was stated that the magnesia combs would bear about 80 hours of active service and cost only from 2½ to 3 cents apiece, while the water gas could be supplied at 50 cents per 1000 cubic feet, leaving, at this figure, considerable margin for profit. The gas consumption was stated to be no greater than with coal gas. A Chicago company was subsequently formed to develop the system, though up to the present the light has not been extensively introduced.

Greater success appears to have attended what is known as the Welsbach burner, which is in the hands of the Welsbach Incandescent Gas Light Company, of Philadelphia, and of which we give several engravings. Before describing this burner, to which we already had occasion to refer when it was first brought out abroad, it may be interesting to note that incandescent gas lights in general have been found to fail because the material to be acted upon by the heat of the gas usually was present in considerable mass and re-

ing at the incandescent electric light. The convenient shape of the mantle adapts it to use with any kind of gas with efficiency. Its steadiness renders it the perfection of light for reading or fine work at night. It should be noted that ordinary illuminating gas is used, though the burner can also be employed to great advantage with both fuel and natural gas. The mantles can be made so as to give a white light or a yellow light of any degree, and a white light could therefore be furnished where it was required for special manufacturing or other purposes, and a brilliant, so called 1 per cent. yellow light for the usual domestic purposes. We understand that the results obtained with this burner applied to natural gas and to manufactured fuel gas have been most flattering, an efficiency of from 10 to 12 candles per foot of gas burned being readily attained. In the matter of economy it should be observed that the only part of the lamp that will require renewal is the mantle, and as the mantles, under ordinary care, will last for periods of from 800 to 2000 hours, and can be renewed at a small cost this item affects the economy of the system only in an insignificant degree. In practice the



Fig. 1.—Complete Welsbach Incandescent Gas Burner.



Fig. 2.—Bunsen Burner, as Used with the Welsbach Burner.



Fig. 3.—The Welsbach Mantle Before the Cotton is Burned Out.



Fig. 4.—The Mantle Ready for Use.

THE WELSBACH INCANDESCENT GAS LIGHT BURNER.

quired a very high temperature to be brought to the required state of incandescence. In the Welsbach burner this point has been very carefully considered, as its method of preparation will show, which is briefly this: Cotton thread is knitted by machinery into long lengths of stockinet. This is cut to suitable lengths for the lamp mantles, very carefully cleaned from all foreign matter, and is then dipped into a solution of salts of the metals lanthanum, zirconium, yttrium and several others. When dry, a platinum wire is run through the hem of the mantle, and it is hung on a wire arbor. The cotton is then ignited and carefully shaped while burning. After an hour or more of burning in a Bunsen flame the mantle is completely oxidized. The cotton has gone off as carbon dioxide, and the oxides of the metals remain in the same reticulated form and fibrous structure that the original cotton had. The mantle is mounted on a light gallery to take an ordinary argand chimney, and placed over a Bunsen burner. Immediately the gas is lighted, the mantle glows with a soft, steady, yet brilliant light, which emanates from its entire surface, and does not produce that painful effect of branding its image on the retina of the eye that is experienced when look-

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mantles would require renewal about every 500 or 1000 hours. The Welsbach Company has a large factory at Gloucester, N. J., and is introducing machinery and organizing a force to make from 25,000 to 30,000 burners per day. It has erected its own fuel-gas works, and, besides the machinery and apparatus for reducing minerals, has a complete chemical laboratory, machine shop, elaborate photometrical rooms, &c. The working force is so organized that each step in the manufacture is carried on in a separate room. First comes the knitting of the mantle by machinery, and then a corps of girls attend to what is called the reinforcing or folding the mantle over at the top, so as to have a larger amount of material through which to thread the platinum wire from which the mantle is suspended. The mantle is dipped in the solution and goes through a drying room, and then to the forming room, where it is given its shape, and then to the burning-out room, where the cotton is entirely consumed, leaving the refractory skeleton of the fabric behind, preserving intact the shape and appearance of the knitted cotton mantle. It is then mounted on the brass-work or gallery, and we have the com-

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plete burner. For purposes of shipment the mantle, after having been burned as described, is dipped in a solution that entirely prevents any damage in transit. At present the light is being developed for large burners, and with these, we are informed, a greater efficiency can now be secured than with the smaller ones. There is claimed to be a large saving of gas and an absence of smoke, sulphur and fumes, points which should readily commend the light to the public.

One other form of burner which has become known to some extent is that controlled by the Lungren Incandescent Gas Light Company, of New York, and invented by Mr. Charles M. Lungren. The burner is formed of a paste of refractory earth pressed through dies into the shape of fine pencils or spirals. Two different forms shown in Figs. 5 and 6, have been made, one of them consisting of a flat coil connected to a platinum wire by means of which it is suspended within the flame of a T-shaped burner. From the upper surface of this the gas issues through a double row of perfor-

tention chiefly to adapting his burner to water-gas, but, it is claimed, it may be made available for the ordinary gas supply by making the refractory frame sufficiently delicate to be raised to the necessary incandescence, by the lower temperature flame of an atmospheric burner.

We understand that there are a great variety of shapes in which the incandescent portion can be made.

The three types of burner which we have considered are, so far as we know, the only ones with which anything like practical work has thus far been done in this country. What has already been accomplished with them, however, is of a most encouraging character, and incandescent gas lighting may soon be a generally applied system of illumination.

Marine Boiler Efficiency.

In going over the question as to the commercial value of forced draft the London *Engineer* recently said:

With the exception of the Great East-

what form a boiler may take, the conditions of working are the same as though a long tube was caused to traverse the water to be evaporated, and in one end of that tube the fire was maintained, while the products of combustion escaped at the other end. The temperature at the furnace end will be so many degrees, which we shall call T , and that at the chimney end will be t number of degrees, and $T-t$ =the heat imparted to the water, other things being, as we have said, equal. But so long as the heating surface remains unaltered, it is well known that as T goes up so will t . The boiler has yet to be made in which t is dependent on the temperature of the water only, and independent of that of the furnace. It may be argued that this is quite true, but that so long as the difference between T and t remain unaltered the economical efficiency of the boiler *en rapport* with the fuel will remain unaltered. But this is certainly not true, because the efficiency of the boiler is measured not by the difference between T and t , but by the difference between t and t' , the temperature of the air entering the furnace; and the larger t is the greater the waste. Those who claim that coal can be burned to greater advantage with a high than with a low furnace temperature in a marine boiler must be prepared to prove that the difference between t and t' is less when the furnace temperature is exalted than when it is low. This they have never done yet. There is not one scrap of evidence to be had in favor of such a contention.

The fight between the Messrs. Cox and the Lehigh Valley Railroad Company, says the Philadelphia *Press*, is the beginning of a contest which may result disastrously to the coal-carrying companies. They occupy a position which cannot be defended. The great mistake was to be so greedy this year as to force somebody to make a fight. After the injudicious advance in coal prices and tolls in July and August it was certain that the row would soon begin, and possibly that the whole matter would go before the Legislature next winter. The cost to the coal-carrying companies is likely, one way and another, to be two or three times as much as they have made by their short-sighted policy this summer and fall. It is true the anthracite companies for a long series of years mined and sold coal at too low a price, and that some kind of concerted action was necessary to improve the trade. When this combination was made, and especially after harmony between the Reading and Pennsylvania was established, it was thought that the good sense and conservatism of the gentlemen who control the trade would be reflected in any action that might be taken. This has not proved to be the case, and this year the control passed into the hands of time servers, who have aroused a strong public sentiment by a sharp advance in prices and a heavy charge for carrying coal, which puts a further tax on the consumer. The result will be an overhauling of the whole matter by the Interstate Commission and probably by the Legislature. If the carrying companies suffer they will have nobody to blame but themselves.

The Minerva Furnace, at Milwaukee, Wis., now operated by the Milwaukee Furnace Company, produced 2494 gross tons of Bessemer pig iron in October, on ores averaging a little under 60 per cent. During the summer, when out for repairs, this furnace was lined up to 14½ feet in diameter at the bosh, and it is only 55 feet high. It is, therefore, but a small furnace to average over 80 tons a day. The fuel consumption has been very greatly reduced this campaign as compared with the previous one.

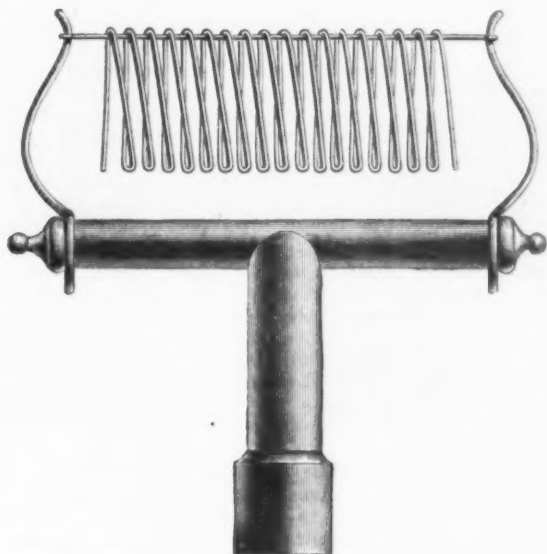


Fig. 5.—Flat Burner.



Fig. 6.—Pyramid Burner.

THE LUNGREN INCANDESCENT GAS LIGHT.

ations. A surrounding globe protects the incandescent material from injury. A second form consists of a coil of refractory earth wound over four uprights. These uprights are considerably heavier than the coil and are designed to bear such a relation to it that the coil may burn nearly all away before they will be destroyed, thus providing against the sudden collapse of the incandescent structure. The coils are wound close together at the bottom to give the incandescent frame additional strength at this point. After the incandescent material has been sufficiently burned, it is mounted in a light metal cap having an annular gutter at its top. This gutter is filled with a plastic composition, by means of which the refractory frame is cemented to the metallic cap. There is, therefore, no occasion for touching the incandescent portion of the structure in handling it to place it on the burner. As additional security, the incandescent structure may be wrapped in paper, which will readily burn off when the gas is lighted. The burner used with this form of mantle will depend upon the character of the gas. Mr. Lungren has heretofore given his at-

tern, there is probably not a steamer afloat the top of whose funnel is 100 feet above the level of the grate bars: About 75 feet may be regarded as over the average along way. It is not easy to say how many tenths of an inch of water this type of chimney will give, because the controlling conditions are so variable, and practically no data taken from actual practice are available. We should say that 3 inches or 4 inches will probably be over the mark at the furnaces. Now, 3 square feet of heating surface with this draft will suffice to give an indicated horse-power; and it is found necessary to provide a certain definite amount of steam room and water surface to prevent priming. Engineers have gone on year after year supplying boilers in which these proportions are observed, and the results have been very satisfactory. It is argued nowadays that they have in effect been putting more boilers, or bigger boilers, than necessary into ships; and that in effect something much less than 3 square feet per horse-power will suffice. Obviously, other things being equal, this can only be true provided more heat is caused to pass through the plates and tubes of the boiler per minute. No matter

Fireroom Practice Aboard Ship.

Referring to the failure of the steamer City of New York thus far to beat the record and the possible reason to be found in the excessively hot firerooms and quarters provided for the firemen, preventing efficient work, the London *Engineer* speaks as follows of fireroom practice generally:

The temperature in both boiler and engine-rooms is often needlessly high. This is due to various causes, but the most important cause is neglect of obvious precautions on the part of some one who has had to do with putting the engines and boilers into the ship. In large deep vessels the lower platforms in the engine-rooms are nearly always cool. The upper platforms, especially about the high-pressure cylinder end, are atrociously hot. There are two ways in which this can be avoided. One consists in providing ample facilities for the escape of hot air. It will not do, however, to rest content with opening skylights above the engine-room. Hot air can only get out if cold air gets in to take its place. If dependence is placed solely on the skylights or gratings over the engines, there will be a constant fight between cold air trying to get in and hot air trying to get out. Wind sail ventilators should be carried right down to the bottom of the engine-room. With their aid a constant rush up through the skylights will be secured, to the great comfort of the engineers. It is hardly necessary to add that the cold air should be distributed, not shot, so to speak, all in one place. Another means of reducing temperature consists in most carefully clothing steam-pipes and cylinders. It is a common practice, for example, to put a false checkered plate cover on a high-pressure cylinder lid. The true lid radiates heat to this until it attains nearly the same temperature as that of the steam in the cylinder. In all cases some good non-conducting material should be interposed between the false and the true lids. Many materials are available, such as sand, slag wool or asbestos.

In shallow ships the firerooms are usually fairly cool. Under the wind sails, at all events, a cold breeze can be found; but in deep ships the case is different. The draft down the wind sails is very local and the firerooms rise to temperatures of 120° or 130°. No European can work to advantage under such conditions. Much of the excessive heat is caused by radiation from the ash-pits, which might be greatly reduced by the use of screens, which have been used, we understand, with success in some foreign ships. They can be removed or replaced in a moment. Some fire doors, again, seem to be specially constructed to roast the stokers; the doors simply become red-hot. Again, sufficient care is not taken to screen the smoke-box doors and the uptakes are not half as well protected as they might be. We have heard it argued, we are sorry to say, that the expenditure of a few pounds in making things comfortable is waste of money. No statement could be more shortsighted. In the hands of the firemen lies to a great extent the success or failure of a ship intended to be fast; and money spent in making these men comfortable when off duty, so that they may get sufficient rest, is money well spent. Not half enough care is taken to provide conditions under which they can work to advantage in the stokehole. There are, of course, exceptions, but the exceptions only bring into more glaring contrast the strange neglect of everything which can add to the efficiency of the stoker manifested in other ships.

The New Jersey Zinc and Iron Company have been exploring with the diamond drill on Mine Hill, a part of the famous

Franklin and Sterling zinc, iron and manganese deposit, with success. The company own all the minerals in Mine Hill, with the exception of the Franklinite. They drilled on the Curtis property, going to a depth of 540, running into the Hill vein of iron. During the course of the drilling they struck the zinc vein in a thickness of 19 feet, samples being now in the hands of a chemist for analysis. This discovery insures them a fresh supply of zinc ore for many years to come.

Steel versus Iron for Roofing.

A controversy has been going on for some time in the columns of *The Metal Worker*, on the relative merits of iron and steel sheets for roofing purposes. It is urged that a good deal of material is sold as steel which is impure and simple, and that considerable quantities of the sheets sold as steel are compound, the belief being expressed at least in one case, that not a manufacturer of iron roofing in the United States is using a single sheet of all steel. A letter to *The Metal Worker* from E. N. Thompson, of the Thompson Manufacturing Company, Cleveland, contains the following:

We begin with tin roofing. This, as is well known, is laid in two ways: first, the flat seam in which the lock is malletted down close all around the sheet. This takes a good quality of either iron or steel to do the work perfectly. Second, the standing seam in which a lower grade of steel or iron can be used, and still do perfect work. Either of these modes of laying require a better grade of iron or steel than any iron or so-called steel roofing manufactured by any manufacturer of iron roofing. The different kinds of iron roofing and siding can be grouped into three classes, so far as quality of material to be used in their manufacture is concerned.

First—Roll roofing, in which the standing seam is made on the roof, and in which the seam is somewhat similar to standing-seam tin.

Second—Pressed standing-seam roofing, in which the caps or standing seams are a part of the sheet itself.

Third—Corrugated, crimped and beaded iron and roll-cap roofing, the separate caps of the latter being made of a better quality when made in longer lengths than the width of the iron.

Now, we assert that an all-steel sheet cannot be made by any sheet mill in the United States and sold as cheaply as iron, or a mixture of iron and steel, to do the work required of it in the above three classes of iron roofing and siding.

As bearing on some of the issues raised, one of the most prominent manufacturers of sheets in Pittsburgh, writes: "Composite sheets in the gauges you name can be made in either of three ways: one side may be steel and the other iron, both sides steel with iron in the center, or both sides iron with steel in the center. We work both of the latter two methods every day, according as the stock may require to be used." It is evident therefore that composite sheets are being made more widely than is generally known.

Exhaust-Pipes and Nozzles.—The shape and size of the exhaust-pipe and the form of the nozzle exert a wonderfully great influence on the economical working of a locomotive. Yet, strangely enough, says the *National Car and Locomotive Builder*, there have been very few exhaustive tests made to demonstrate the relative value of different forms. Since the movement began to dispense with the diamond stack with its associates, the low double nozzle and petticoat pipe, the different railroads have been working into appliances to suit the open stack that are in most cases fairly efficient for maintaining draft and for passing out the steam without back pressure; but the work of identifying the most correct dimensions has been carried on in a haphazard way, and on not a few roads, through mistaken notions as to the functions of draft appliances, ex-

haust-pipes and nozzles are used that must cause great waste of fuel and steam. At the last Master Mechanics' Convention a committee was appointed to investigate the subject of Exhaust-Pipes and Nozzles. The committee consists of C. F. Thomas, of the East Tennessee, Virginia and Georgia; A. W. Gibbs, of the Richmond and Danville, and G. D. Harris, of the Mobile and Ohio. The mechanical officers of the first-mentioned roads have displayed unusual interest in the subject of proper proportions of exhaust-pipes and nozzles, and both companies have experimented at considerable length to ascertain the best forms. The experiments have been continued since the convention, and it is certain that by the time for making out the report to the association arrives a mass of original data will be collected that will make the report of high scientific value.

The Iowa Jobbers and the Railroad Commissioners.

—The Iowa Railroad Commissioners filed an opinion on the complaint of Burlington and Davenport jobbers, charging conspiracy and discrimination against four leading Iowa railroads. They dismiss the charge of conspiracy and sustain that of discrimination, and issue an order re-enacting their schedule which the courts enjoined them from enforcing. The board says: "The evidence on the question of discrimination in Interstate rates against Iowa shippers develops a system of rates so unjust as to be a serious blow at the business prosperity of those thus engaged in the State. The low rates obtained by Iowa jobbers from the Eastern markets are neutralized by the high local rates within the State, so that the fifth-class rate in and the fourth-class rate out are largely in excess of the class from Chicago to Iowa points, and our dealers are placed at such a disadvantage as to destroy largely their profits and to seriously cripple their business; in fact, some of them declaring that unless relief comes in a reduction of high local rates they would be compelled to leave the State and go to where they could do business at a profit. In many instances the discriminations in rates in favor of Chicago merchants are 20 to 25 per cent., and representatives of Iowa business houses find themselves at such a disadvantage as to be unable to compete, unless at a sacrifice. The result is that our business interests in Iowa are languishing and the field is given up largely to Chicago dealers. What is true of the Iowa jobbing interests is largely the case in reference to the manufacturing interests of the State. From careful comparison of the rates and the testimony in this investigation the commissioners are of the opinion that a fair reduction of local rates within the State is the proper remedy for the protection of Iowa interests against the injustice they are subjected to from discriminating Interstate rates." The opinion is signed by Commissioners Smith and Campbell. The other commissioner, Mr. Dey, says he has been threatened by the jobbers in case he did not give his opinion before November 3, and so he declines to state his views until after the election.

The Calumet and Hecla Copper Company have bought the Metalline property at a price estimated at \$500,000 upward. It was offered to Tamarack for \$500,000, and Tamarack is believed to have wanted it, but, while it hesitated, Calumet bought the lot. It is considered a valuable acquisition, and already it is surmised that the company will now surely divide its property and organize a new company. That may happen, but does not necessarily follow. The new purchase embraces 40 acres, and lies between the Tamarack and Calumet and Hecla.

New Square Pipe Former.

A machine adapted for making square heater pipes, conductor pipe, boxes, cans, flashings, &c., has recently been placed upon the market by P. B. Calvert & Co., of Philadelphia, Pa. This machine, a general view of which is afforded by means of the accompanying illustration, is of such a character that in addition to being used in connection with a standard can be placed upon any work bench with equally satisfactory results. It is the invention of S. Y. Buckman. The machine is designed to bend iron as heavy as No. 24 gauge, 34 inches wide, and at any angle up to 90°. By means of this device we are informed that pipe 2 inches and larger in size may be formed into 30-inch lengths, perfectly straight and square. It is stated by the manufacturers that by the use of the gauge attachments all the bends can be made without first laying off the sheets. The machine is carefully constructed and its principal features are the

property immediately prior to the assignment, or on the ground that all or some of the preferences were bogus. Then there occurred a change in the manner of failing; and debtors resorted to confessions of judgment, which were invariably given for alleged borrowed money advanced by wives, brothers, fathers and even sometimes by mothers-in-law.

Under confessions of judgment, the sheriff would take possession of the stock of goods; and the only ready remedy for the merchandise creditors to pursue was replevin. But herein the creditors often showed as much dishonesty as the debtors, by claiming, under their writs of replevin, goods never sold by them, and which they had no moral right to take. These replevin proceedings often depleted the stock in the sheriff's hands to such an extent that very little was left to apply on the confessions of judgment, and again the debtor and his "confidentials" were foiled. But the system of giving preferences worked so much harm to the honest

creditor class, that last year the Legislature passed a law allowing preferences in general assignments only to the extent of one-third of the actual assets; and since then it has been a serious question whether confessions of judgment or any other mode of preference beyond the statutory limit can be valid. For this reason the failures that have taken place since the enactment of the anti-preference law have been characterized by the grossest fraud, and the rule is that when a failure is publicly announced the stock of goods has disappeared, and to-day it is a common occurrence for debtors to owe upward of \$50,000 for merchandise bought within four months of the time of failure, and yet to not have on hand \$2000 of merchandise. A clothing dealer failed on Broadway a fortnight ago, owing \$40,000 to different merchants; and not a single dollar's worth of goods was found on hand. This fraud was so palpable that the debtor fled to Canada to avoid criminal warrant for his arrest. A recent canvass among the wholesale woolen merchants in the dry goods district disclosed the astonishing fact that they have not averaged a dividend of 15 cents on the dollar out of their bad debts for the last ten years; and they all complain that the laws and present decisions of the courts of this State

favor the failing debtor, and that radical changes should at once be made.

A lawyer who for the last ten years has made a specialty of commercial features, when questioned as to what changes ought to be made in the law in order that the creditor class should not suffer, suggested that the insolvency laws now existing in the New England States, which effectually prevent preferences and fraudulent disposition of assets, should be adopted here; that the books of the debtor should at once, upon the failure, be deposited with an officer appointed by the court, and if the books did not honestly account for all the assets the debtor should be deemed guilty of fraud, and imprisonment the same as for a misdemeanor should follow; that all modes of preference, either by confession, bill of sale, mortgage or assignment, should be abolished, and a creditor be at liberty, without first procuring a judgment, to bring an action to set aside and examine into all of the debtor's transfers made within one year of the failure; and, generally, that our criminal laws should be amended so that commercial fraud of all kinds could be dealt with as severely as crimes against the person and the public welfare. He said that imprisonment in Sing Sing of one fraudulent debtor would do more to check dishonest failures than all the civil remedies now on the statute books.

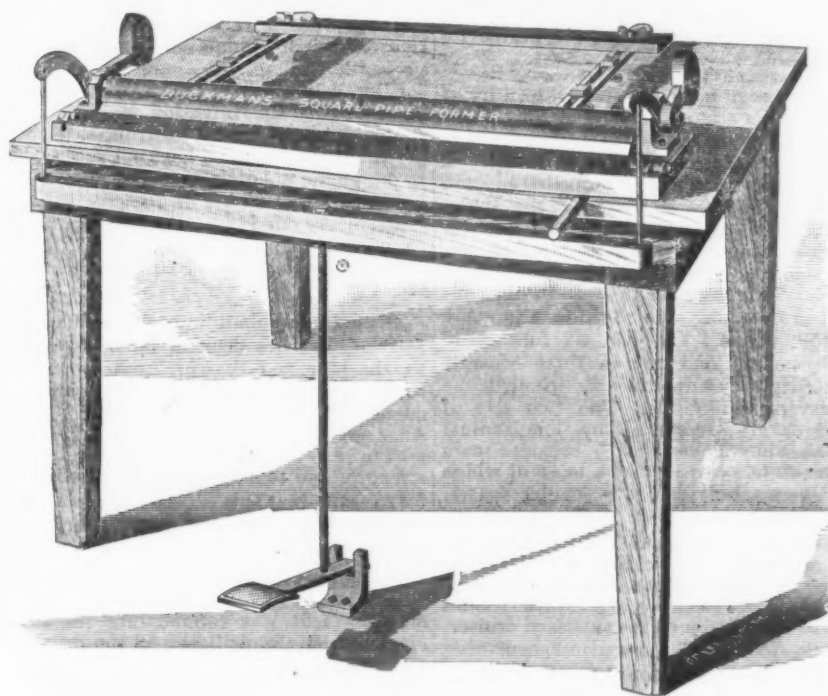
To illustrate the facility with which frauds of this class are committed, a single instance will suffice. A creditor, finding his debtor backward in his payments, called upon him, and was promised a settlement on the following day. He called the next day, and found that during the night the debtor's place of business had been destroyed by fire. Being assured by the debtor that there was sufficient insurance to pay all debts, the creditor, who was a director in several insurance companies, brought about an immediate settlement of the loss, and, upon learning that the fire-insurance companies had paid the debtor, called upon him once more and congratulated him upon being able to reopen his business. Incidentally the creditor asked for payment of his claim, and was stunned by the debtor telling him that he could not pay, and that "the money from the insurance belonged to his wife by her first husband." The enraged creditor then called the debtor all the bad names he could command, and the debtor, apparently unconcerned, replied that he hoped that after the business had been run in his wife's name for a few years he could make a settlement of 25 cents on the dollar, and that the creditor might then hear from him.

The Boston Herald presents a table showing the advance in 12 copper properties in which Boston is interested since January 1, present prices being taken rather than the highest price.

	Points advance.	Amount advance.
Allouez.....	3 3/4	\$310,000
Atlantic.....	5 3/4	235,000
Boston and Montana....	31	3,100,000
Calumet and Hecla....	120	12,000,000
Central.....	2	40,000
Franklin.....	3	120,000
Huron.....	2	80,000
Kearsarge.....	8	400,000
National.....	6 1/2	360,000
Pewabic.....	2 3/4	105,000
Quincy.....	26 1/2	1,060,000
Tamarack.....	50	2,800,000

Total 12 stocks.....\$20,510,000
One stock, Osceola, is omitted, because there has been almost no change in the value of its share capital.

During the first seven months of the present year the exports of Chili have reached \$7,000,000 more than during the same period of last year.



NEW SQUARE PIPE FORMER.

basis of patents which are now pending. The weight of the machine is only 75 pounds.

How Men Fail in New York.

The eminent writer on economics, Edward Atkinson, has said that "nine out of ten men who engage in business fail." If this is so, the question naturally presents itself: How do they do it? This question, which is of equal interest to creditors and failing debtors, is answered by a writer in the *Tribune* as follows:

After the Bankruptcy law was repealed, failing debtors could, under the law of this State, make preferences in general assignments to the full extent of their assets. As a consequence, there were very few assignments made which did not contain preferences that covered all the debtor's property; and general creditors, as a rule, received no dividends whatever. These preferences were largely given to relatives and friends for alleged borrowed money, and the merchandise creditor would invariably be told by the debtor that the "confidentials" had to be taken care of. After awhile the merchants began to attack such assignments, and many were set aside for fraud in the disposition of

creditor class, that last year the Legislature passed a law allowing preferences in general assignments only to the extent of one-third of the actual assets; and since then it has been a serious question whether confessions of judgment or any other mode of preference beyond the statutory limit can be valid. For this reason the failures that have taken place since the enactment of the anti-preference law have been characterized by the grossest fraud, and the rule is that when a failure is publicly announced the stock of goods has disappeared, and to-day it is a common occurrence for debtors to owe upward of \$50,000 for merchandise bought within four months of the time of failure, and yet to not have on hand \$2000 of merchandise. A clothing dealer failed on Broadway a fortnight ago, owing \$40,000 to different merchants; and not a single dollar's worth of goods was found on hand. This fraud was so palpable that the debtor fled to Canada to avoid criminal warrant for his arrest. A recent canvass among the wholesale woolen merchants in the dry goods district disclosed the astonishing fact that they have not averaged a dividend of 15 cents on the dollar out of their bad debts for the last ten years; and they all complain that the laws and present decisions of the courts of this State

THE WEEK.

A strike in the Australian coal mines, which has rendered useless a large amount of ocean tonnage, on account of the dearth of fuel, has at last terminated. This event is expected to have an appreciable influence in reducing rates of freight, which, of late, have reached exorbitant figures.

The Westinghouse Electric Company, of Pittsburgh, have been awarded the contract for a central station plant in the city of London, England. The contract calls for 25,000 16-candle power incandescent lamps, and is much larger than any contract previously obtained by this company.

Copper mining in Mexico, stimulated by increased prices for ingot metal, is at present very active, and a belief is expressed that the output can easily be increase tenfold.

The rate in New York for the present year is \$2.22 per \$100 on real estate. Tax Commissioner Coleman believes that it will not exceed \$2.20 next year. In Brooklyn the rate is \$2.72, against \$2.76 last year.

Another substitute for jute bagging has been found in the interior bark of the cotton plant, which is readily and easily decorticated, and can be manufactured into bagging and cloth for bags by the machinery used in the jute mills.

The United States Consul at Tahiti reports to the Department of State that the new tariff for that island has been vetoed, which action renews the old 13 per cent. tariff.

Of the total arrival of vessels at this port from foreign countries during October, numbering 455, only 117 were American, against 233 British. The number of vessels in port is 408, of which 57 are steamships and 50 ships.

The report of the Lighthouse Board recommends an appropriation of \$3,107,310 for new aids to navigation, and of \$2,292.50 for the lighthouse establishment. Among the special appropriations asked for the next fiscal year are: Sandy Hook light vessel, \$60,000; sea wall at Staten Island lighthouse depot, \$40,000; Statue of Liberty building pedestal, \$50,000.

The Governor of Washington Territory estimates the population of the Territory at 167,982, an increase of about 24,000 during the year. The taxable property of the Territory is valued at \$84,621,182, which is a gain of over \$65,000,000 in the last ten years.

The steamer Haytien Republic, which has been seized on a charge of attempting to run the blockade with arms and men on board, is owned by B. C. Morris & Co. and others, of Boston, and was built for the Haytien trade at an expense of \$100,000. Mr. Morris is positive that the boat had nothing in her cargo when she left New York that would warrant her detention or seizure. An American warship will be despatched to Hayti without delay.

The German Government proposes to resume the building of large ironclads, which was stopped after the wreck of the Grosser Kurfurst. A bill providing a credit for the building of eight ironclads will be sent to the Reichstag.

The law of 1887 requiring that railroad companies that run 50 miles or more within New York State shall do away with stoves for heating passenger cars went into effect 1st inst. At the Grand Central Depot it was announced that the law was being observed and that before long not a stove would be in use. "During the past year,"

it was said, "the New York Central officials in the passenger equipment department have been actively employed in testing various devices for heating cars by means of steam obtained direct from the locomotive, and have decided on a system combining simplicity of construction and management with the most satisfactory results. A 2-inch iron steam-pipe runs under each of the cars, connection between the cars being made with a metallic joint and a sleeve. This main pipe connects with a system of pipes inside each car, one running lengthwise of the car, with branch pipes extending under the seats. At the center of each of the interior pipes is a key by which the steam from the main pipes can be cut off, thus reducing the temperature of a single car without interfering with that of cars more distant from the locomotive, which is the source of the steam supply. Since the advent of autumn all the cars composing the trains known as the New York, Chicago and St. Louis vestibule limited and the New York, Chicago, Cincinnati and St. Louis fast express, besides a large number of the local trains running on the various parts of the road, have been successfully heated by this means."

The new Inman Line steamship, City of Paris, sister ship to the City of New York, was successfully launched. The vessel is in every respect identical with the City of New York. She will be propelled by twin screws. The engines are of the three-crank triple-expansion type, and are designed to indicate 18,000 horse-power. The boilers are nine in number, built of steel. They are each 15½ feet in diameter and 19 feet long, and work to a pressure of 150 pounds. There are six furnaces to each boiler, and are in three separate water-tight compartments, divided by transverse bulkheads. The two sets of engines are separated by longitudinal bulkheads. There are 15 separate main water-tight compartments, most of which are again subdivided into smaller spaces. The auxiliary engines number in all 37. Hydraulic power is employed to work the steering gear. The rudder is a specialty, being a patent of the firm's and adds greatly to the efficiency of the vessel should she be commissioned as an armed cruiser, owing to the improved maneuvering power. In this connection it may be stated that the vessel's decks have been specially strengthened for carrying guns, so that in all respects she will make an efficient armed cruiser.

The *Financial Chronicle* publishes a summary cabled from England of Mr. Ellison's annual cotton review, giving information as to the extent of European cotton consumption. The returns show that European spinners took 3,055,000,000 pounds of cotton during the year from October 1, 1887, to October 1, 1888, compared to 2,932,000,000 pounds in 1886-87 and 2,847,000,000 pounds in 1885-86. The increase was evenly divided between the Continent and Great Britain. The European stocks on October 1, 1888, are computed at 245,000 bales, compared to 218,000 bales in 1887 and 221,000 in 1886. Mr. Ellison estimates that to maintain last year's rate of consumption an American crop of 7,100,000 bales will be needed. The European demand for 1888-89 he estimates at 7,488,000 bales, compared to 7,277,000 during the past year, and of this amount 4,670,000 bales should be drawn from America.

Business houses that have dealings with commercial agencies will be interested in a case against Bradstreet's decided last week in Philadelphia by Judge Gordon. Crew, Levick & Co., oil merchants, sued the Bradstreet Company to recover damages for alleged untrue information furnished them. The plaintiffs had asked

the agency to give them a report of the Union Refining and Mfg. Company, of New Jersey, and they reported that the company had a paid-up capital of \$600,000 and were in good credit. On the strength of this Crew, Levick & Co. gave them credit for the amount of \$1500, which they have never been able to collect. It was alleged that the Union Refining Company were insolvent at the time the report was furnished. The judge, on a motion for a non-suit, granted it, on the ground that the contract was as if between two private people, the defendant corporation being a private and not a public one, and that Crew, Levick & Co., in signing their contract with them, had waived the right to recover on the ground which they are now striving to get a verdict. He said that if they could have proved willful or malicious negligence the circumstances would have been different.

In his annual report General Benet, Chief of Ordnance, says that the bureau expended \$1,507,382 during the last fiscal year, and that 41,130 rifles and carbines were manufactured at the national armory. Investigations have been completed relative to the determination of the charge, projectile, rifling, &c., for an arm of smaller caliber than the present service piece. It is the intention to use compressed and perforated cartridges, but as yet the powder makers have not succeeded in producing a satisfactory powder. The report says that a tract of 70 acres of land immediately outside of the city limits of Columbia, Tenn., has been selected for an arsenal, and the work of construction will begin as soon as the title is accepted.

Domestic shipbuilding shows unusual activity, and the demand for new vessels for the lake and coasting trade promises to be well sustained for a long time to come. The iron and steel vessels recently constructed for service on the lakes are said to have shown unexpected speed and strength, and to have given such satisfactory results that this superior type of vessel is likely to be most in demand throughout the next building season.

To prevent excessive production in the Pennsylvania oil fields and to sustain prices an agreement was entered into one year ago between the drillers and the Producers' Association to shut down until November 15, when another contract will be considered, with similar objects. Meanwhile the oil drillers are striking new wells in expectation of enlarging their operations.

The Interstate Commerce Commission has called upon all subsidized railroad and telegraph companies to report, as required by act of August 7, 1888, whether they are maintaining and operating telegraph lines for the use of the Government or the public for commercial and other purposes without discrimination, and whether they have made and continued such arrangements for the interchange of business with any telegraph company.

Wooden shipbuilding in the Maine yards has taken a fresh start. Ten square-rigged vessels will be built during the coming winter, besides a large number of schooners. It is announced that Arthur Sewall has made the New England Shipbuilding Company a proposition to the effect that if they will put in a plant and build an iron ship he will take a half interest in the vessel.

A cataract comparable to Niagara Falls is said to have been discovered in Colorado, and there are "several more counties to be heard from" in that great State.

Claus Spreckels' beet-sugar factory in California is running night and day, and the results are so favorable that several other refineries will probably be established.

MANUFACTURING

Iron and Steel.

Harry Darlington, a brewer and capitalist of Pittsburgh, has just leased the plant of the Elba Iron and Bolt Company, Limited, in that city, and will put it in operation as soon as the necessary repairs can be made. Between 400 and 500 men, who have been idle since the works were closed down in January last, will be given employment. The plant of the Elba Iron and Bolt Company, Limited, was operated in connection with the Continental Tube Works by a number of prominent business men and manufacturers of Pittsburgh. It is stated that the profits from the Elba plant were entirely satisfactory, but the pipe trade was considerably depressed and money was lost by the Continental Tube Company. This led to financial embarrassment, which resulted in the closing of the two plants last January. The Elba plant was built in 1862, and has 28 single puddling furnaces, 6 heating furnaces, and 4 trains of rolls (one 8-inch; one 10-inch; one 18-inch, and one muck train) and had an annual capacity of 26,000 tons of skelp iron.

It is reported that the Pittsburgh and Lake Erie Railroad Company are endeavoring to purchase the Clinton Rolling Mill, at Pittsburgh, formerly operated by Graff, Bennett & Co. If the purchase is consummated the mill will not be closed down as a consequence, but the entire plant will be transferred to the works on the upper side of Carson street.

From the Hubbard (Ohio) *Enterprise*, of the 24th inst., we take the following: "A meeting of those interested in the building of a sheet mill in Hubbard was held at the bank Tuesday afternoon, and the outlook for a plant is decidedly rosy. Hubbard will furnish \$15,000 of the capital stock, and the balance will be put in by Mr. Ward and a party of practical mechanics. Should the mill be erected it will likely be run on the co-operative plan, and a dozen of the employees will be stockholders in the establishment to the extent of \$1000 each."

James McNeil & Bro., proprietors of the Vulcan Tank and Boiler Works, at Pittsburgh, have a contract for making gas pipes for the Philadelphia Natural Gas Company which measure 36 inches in diameter, and are made from what is known as heavy plate iron, used for making tanks for boilers. Each connection of pipe is 40 feet long, and at each end it is connected together by an expansion link. Six hundred feet of this size have already been made.

A statement was recently published in the Pittsburgh papers to the effect that the Carbon Iron Company, of that city, of which Horace W. Lash is general superintendent, had made some important changes in their process for the manufacture of steel, by which the product was greatly increased and the cost of manufacture considerably reduced. We find that the statement contains very little truth. The company have always used more or less coke in their process and expect to continue its use. The firm are gradually improving their methods for the manufacture of steel, and expect to turn out a steel the strong point of which will be a superior quality.

The two charcoal blast furnaces of the Jackson Iron Company, at Fayette, Mich., are to be closed down during the coming winter. This step is made necessary by the scarcity of fuel within easy hauling distance of the furnaces, which have been in operation for many years, and have used the charcoal made from the timber cut

from the lands of the company for a radius of 10 or 12 miles from the furnace. The cost of preparing and hauling the charcoal has at last grown so great that iron cannot be made there at any profit during the winter, and for that reason the furnaces will be closed down in a short time. The charcoal kilns will be kept at work during the winter, and the furnaces will probably be put in blast again in the spring.

On Wednesday, the 24th ult., the Allentown Iron Works, of Allentown, Pa., blew in No. 1 Furnace, and on the 26th ult. No. 5 Furnace was blown out for repairs. The latter stack will be relined and put in blast as soon as possible. This firm have three blast furnaces, Nos. 1, 4 and 5, No. 1 being the only stack in operation at present.

We are informed that the report that the Bellaire Nail Works, of Bellaire, Ohio, had recently introduced a new system of making steel by which they were enabled to dispense with the services of 40 men is without foundation.

The Blakeney Foundry Company, of Springfield, Ohio, have recently made an addition to their foundry, 100 x 50 feet, which has almost doubled its capacity. The firm employ 85 men, and report plenty of orders on hand. The firm manufacture principally castings for railroad work, and are at present engaged in a large order for Chicago cable roads. About 30 tons per day are being produced, of which 20 tons are for these cable roads.

The blast furnace of the Wheeling Iron and Nail Company, of Wheeling, W. Va., which has been idle for some time undergoing repairs, has resumed operations. The repairs and improvements of the furnace have been thorough; three of the four hot-blasts were torn away, and two new ones with increased capacity were erected, which are expected to add to the output of the furnace.

About 700 men will be employed in the converting and blooming departments of the new Bessemer steel works now in course of erection by the Allegheny Bessemer Steel Company, at Duquesne, Pa. The employees in the last-named department will be very few, as the entire mill will be operated by machinery. There will be only one man at each train of rolls. He will control the "piece" or bloom by means of hydraulic levers, thus dispensing with the service of a large number of employees who are required in other rail mills. The converting mill cost \$300,000, while the rail and blooming plants cost \$600,000, making the entire cost of the works \$900,000. The company at the commencement will have to purchase all the pig metal used from outsiders, but it is the intention to erect two blast furnaces close to the rail mill. It requires the product of two furnaces to keep the mills supplied. The work on this improvement will likely be commenced in the early spring.

Machinery.

The Reliance Gauge Company, of Cleveland, report rapidly growing demands for their safety water columns from all parts of the country. Among the orders recently booked are 32 for the Reading Iron Works, of Philadelphia, Pa., 10 for the California Electric Light Company, of San Francisco, 6 from Australia and 3 from the City of Mexico. Among the large concerns who have recently adopted these safeguards are the Whiteman Paper Mills, of Danville, N. Y., and the Fall Mountain Paper Company, who are placing them in their several mills, located in Vermont, New Hampshire and Massachusetts.

The Laidlaw & Dunn Company, of Cincinnati, Ohio, have carried off a number of medals at the centennial exposition, one of

them being for their well-known standard Duplex steam pump.

Messrs. Lodge, Davis & Co., Cincinnati, Ohio, report under date of 1st inst., large orders for tools and machinery for the Long & Allstatter Company, of Hamilton, Ohio; the Missouri Pacific Railway Company, St. Louis, Mo.; the East End Gas Works, Cincinnati, Ohio; the Hoffman Machine Company, Detroit, Mich., and the Eagle Iron Works, Detroit, Mich. Two carloads of machinery were sent to San Francisco last week.

The Hill Clutch Works, of Cleveland, Ohio, have opened a branch office at Kansas City, Mo., at 1221 Union avenue, under the management of Mr. A. M. Morse, who has for years been engaged in that section in engineering and machinery business. They now have branch offices in New York, Chicago, Minneapolis and Kansas City, with general office at Cleveland. They have just contracted to put in a complete outfit of power transmission machinery according to their designs for the New Bedford Gas Company, Massachusetts, and are also making extensive additions to their own works. The Niles Tool Works, of Hamilton, Ohio, have orders now in hand for them for one 10-foot boring and turning mill, also for a 5-foot mill.

Boys, Porter & Co., Limited, proprietors of the Connellsville Foundry and Machine Shop, at Connellsville, Pa., report plenty of orders on hand. They have recently made large shipments of machinery to Southern and Western points. An enlargement of the plant in the near future is contemplated.

George Westinghouse, Jr., of Pittsburgh, has purchased almost the entire capital stock of the Waterhouse Electric and Mfg. Company, of Hartford, Conn. This gives the Pittsburgh company a large interest in the arc light business, as the Hartford company have now over 3000 lights in use.

The Davenport Foundry and Machine Company, of Davenport, Iowa, write us as follows: "We are quite busy in our works and are getting out ten fly-wheels 14 feet diameter, weighing each about 18,000 pounds; ten large disk cranks and couplings, &c., for the Davenport Water Company; also a large lot of castings for the Hawkeye Electric Mfg. Company, who are locating here. They will have their works in operation December 1. Beside this we have 12 engines under way and a lot of job work."

The Machinists' Supply Company, of Chicago, Ill., have just issued their catalogue No. 2, devoted, as the name of the company implies, to machinists' tools and supplies such as are now in use in general shop practice. It embraces nearly 300 pages, and is illustrated throughout, by descriptions also being given and tables of sizes and prices added. We have no doubt that it will prove very useful to those for whom it is specially intended.

Hardware.

The Hartman Mfg. Company, of Beaver Falls, Pa., are shipping large invoices of wire mats to foreign countries.

The Scotford Mfg. Company, of Kenosha, Wis., have begun the erection of buildings for the purpose of manufacturing brass novelty goods. They will introduce the latest and most approved machinery for this purpose.

The Kenosha Mfg. Company have been organized with a capital of \$40,000, and will erect a plant near that of the Scotford, above mentioned. G. M. Simmons is president; James Cavanagh, vice-president, and William W. Strong, secretary. They will put up two buildings and will manufacture brass utensils and novelties.

E. T. Barnum, Detroit, Mich., is filling a large order for ornamental wire and iron-work going to Sydney, Australia. This foreign trade, we are advised, has been for a long time an important part of his business, his goods being well known in the colonies.

About August 1 the Findlay Rolling Mill Company, Findlay, Ohio, purchased the plant of the Stirling Chain Company, of Cuyahoga Falls, Ohio, and removed it to Findlay, where they are operating a rolling mill for the purpose of making a uniform high quality of iron such as they require for the manufacture of axes, hatchets, adzes, mattocks, picks, grub hoes and chain. They now have their plant in active operation, working 34 fires on coil and cable chains $\frac{1}{4}$ to 2 inch. Their building is 150 x 35 feet, with additions of 16 x 20 for engine and boiler room and 20 x 46 for link room. Their entire plant is operated with natural gas as fuel, which, they advise us, enables them to make unusually clear and perfect welds. Their capacity in the chain department is 10 to 12 tons per day.

The Gate City Stone Filter Company, have, as usual, an extensive exhibit this year at the American Institute Fair. Their space is near the right-hand corner of the main hall, and is one of the first the visitor comes upon when entering the building. The goods of this company are very generally known and hardly anything more is necessary to be said than that they show their Filters and Coolers in all styles and finishes. From the very plainest Filter to the most ornamental style of porcelain, all grades, sizes and styles are exhibited.

The J. H. Pocock Can Company, Second street and Franklin avenue, St. Louis, Mo., write us that they have just completed the purchase of 50 feet of ground adjoining their present site on the north, and have made all arrangements for erecting a new building next spring, with a frontage of 125 feet on Second street, four stories high, and running east to Waddingham street, depth of 150 feet. The new building will be equipped with the latest improved machinery, turning out work promptly and satisfactorily.

One of the first exhibits to strike the visitor at the American Institute Fair is that of L. H. Mace & Co., 111-117 East Houston street, New York, manufacturers of Refrigerators, Meat Safes, Wooden-Ware, &c. The exhibit occupies a space on the left-hand side of the entrance to the hall and covers considerable ground. The various goods manufactured by Messrs. Mace & Co., are effectively distributed, and the visitor has opportunity to inspect the different styles, sizes and finishes of Refrigerators made by this concern, in addition to the other goods. A circular, specially gotten up for the fair, is distributed.

The Prescott Hardware and Mfg. Company, of Chicago, a new corporation, in which Kellogg, Johnson & Bliss, the well-known hardware dealers, of Chicago, are interested, have succeeded to the business of the Prescott Mfg. Company, of Boston, manufacturers of the Prescott patent trackless sliding door hangers for house and barn doors. These hangers have been upon the market for a number of years, and have been widely introduced throughout the country. The company's plant will be removed to Chicago after the stock now on hand is worked up. The Prescott Hardware and Mfg. Company, of Chicago, will manufacture other hardware specialties after their factory is under way in Chicago. Mathias & Knapp, Western agents of the old company, will manage the business of the new one. The trade may send all

orders to the company's main office, 108-110 Randolph street, Chicago, or to the various local agents of the old company, whose contracts have been assumed by the new company.

Growth of the Marine Engine.

In a paper on "The First Century of the Marine Engine," recently read before the British Institution of Naval Architects, Prof. Henry Dyer follows the development of the engine in a very interesting manner. We extract from it the following:

For the first 20 years after the establishment of ocean navigation the side lever engine was employed almost entirely in the larger mail packet companies, and was essentially Watt's engine, modified in some details. The Americans used, and to a large extent still use, the ordinary beam engine for paddle steamers, but in Britain, in order to economize space and keep the center of gravity of the engines low, they were inverted and thus became what were called side-lever engines. Some of them were magnificent specimens of architecture, but engines of this type were by no means self-contained, the keelsons and framing of the vessels being largely relied upon for resisting the stresses arising from the action of the engines, and of course under such conditions a low pressure of steam and uniformity of motion were matters essential to their safe working. The pressure of steam was generally from 3 to 5 pounds and seldom exceeded 10 pounds on the square inch above the atmosphere, while the space occupied in the hull by the engines and boilers was nearly one-third of the ship's length. No trustworthy figures can be found to show the consumption of coal, but for the period mentioned it was seldom less than 7 pounds per I H.P. per hour. In a few cases horizontal engines were placed between the paddle-wheels, but these were objectionable on account of the weight they caused to be placed on the deck. To obviate this difficulty the steeple engine was designed by David Napier, and continued to be used for many years, especially by river steamers. It is now, however, seldom made, the direct-acting diagonal or the oscillating engine—which was first designed by Penn, in 1837—being generally employed for paddle steamers.

When the screw propeller was introduced, chiefly through the exertions of Mr. F. P. Smith and Bennett Woodcroft in this country and Captain Ericsson in America, the same kind of engine was used for driving it as was employed for paddle vessels, the connection between the crank and the propeller shafts being effected by means of gearing. The first British steamer of any size fitted with a screw propeller was the Archimedes, 237 tons, and built on the Thames in 1839. It was tested under Admiralty supervision, between Dover and Calais, with the fastest paddle-wheel mail packet on the station, and so satisfactory were the results that the Admiralty felt justified in introducing the screw propeller into the Royal Navy, and they led to the construction of the Rattler, which was launched from Sheerness Dockyard in April, 1843. The Rattler proving satisfactory, several other screw vessels were built for the Navy. In the merchant service, also, the screw propeller made slow progress. The Great Britain, built in 1843, was the largest vessel of that day, and was remarkable not only for her size, but also because she was built of iron and was propelled by a screw instead of paddles. She was 322 feet over all in length, 48.2 feet in breadth and 31.5 feet in depth, with a gross tonnage of 3270. She was built at Bristol from the designs of Brunel, her engines were made by J.

Penn & Sons, Greenwich; her boilers by Fawcett, Preston & Co., Liverpool, and her engines were secured to the propeller shaft. The Great Britain made her first trip across to New York in 15 days, and afterward for many years was well known on the Australian trade. As screw propulsion became more common gearing was gradually dispensed with and the direct-acting inverted or horizontal engines were used. These may be looked upon as the normal type of engines for the larger vessels employed in the merchant service and the Navy respectively.

For a considerable time after the establishment of ocean steamship trade little attention was paid to the direct economy of fuel, although various causes, such as the improved form of the hulls, the use of iron in their construction, and the introduction of the screw propeller, led to a greater tonnage being propelled with the same amount of coal. There seemed to be a very general belief that high-pressure steam was not only unnecessary, but was positively a disadvantage and a danger. Gradually, however, this opinion changed as the necessity arose for extending trade to foreign countries where coal could not be readily obtained, and the pressure of the steam was gradually increased, although in many cases this seems to have been brought about in consequence of greater confidence in the materials of construction than from a distinct knowledge of the principles involved. Among those who led the way in the design and construction of engines of a more economical type the names of John Elder, Charles Randolph, and John M. Rowan deserve to be specially mentioned among Clyde engineers.

On the trial trip, and during many years' subsequent service, the consumption of coal in these steamers was from 24 pounds to 3 pounds per indicated horsepower per hour—a degree of economy never before realized in marine engines, amounting as it did to a saving of from 30 to 40 per cent. of the coal previously burned by steamers of the same class. This success induced the company to have their whole fleet fitted with engines of the same type, as to them the question of coal economy was of vital importance, owing to the great cost of sending coal to the Pacific stations. The next set of engines made for the company was of exactly the same size, and was worked with the same pressure as the engines of the Valparaiso, but with the difference that they were steam-jacketed all over, instead of merely at the ends, and the result was that the indicated power rose from being under 900 to 1150 horse-power—a result which shows the advantage of the steam-jacket if used under proper conditions. For a good many years, however, little progress was made by the compound engine, except with the company who had introduced it. Some others had compound engines made by various makers, but bad design prevented them from being as successful as they ought to have been, and in a few cases they were taken out and replaced by single-cylinder engines. Moreover, the engines of the Woolf type, designed by Randolph & Elder, were not fitted to give the highest efficiency, and it was not till the "receiver" type of engine, with cranks at right angles, was introduced by Nicholson and brought prominently before the public by E. A. Cowper, that the compound marine engine became almost universal in the merchant service. Until about 1868 or 1870 the inverted direct-acting two-cylinder simple engine held the place in the mercantile marine formerly occupied by the side-lever engine. At these dates, however, the paddle-wheel had been almost entirely superseded by the screw in the propulsion of ocean-going steamers.

The Iron Age

New York, Thursday, November 8, 1888.

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CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The result of the election will be received with satisfaction by the majority of the readers of *The Iron Age*, because it puts at rest for a long time to come a question which has been eagerly discussed during the past few months. Protectionists will feel that the victory won was not dearly bought at the cost of the temporary suspension of business and the halt in all markets for some time past. The contest has educated a very large number of our citizens on the main issue, and has made business men and the workers familiar with many facts which have strengthened their position on the tariff. No one will doubt that in the future they will be able to grapple far more intelligently and therefore more successfully with questions affecting the business interests of the country. It has broadened their views and extended their knowledge. These are achievements which should not be valued lightly. The community will at once return to the active prosecution of its daily work. We look to an almost immediate quickening of the pulses of commerce. We know that in the fields which *The Iron Age* watches closely a very large amount of business has been in abeyance. Buyers and sellers alike have hesitated for months, although it was acknowledged that with the exception of a few lines the features of the situation warranted a brighter future. When the political excitement began to run high the advancing tendency witnessed during the summer was lost, and the markets have been stationary for two months at least. A thorough search for the causes of this halt failed to develop any other than that named. Now that it is removed, the only reason for doubting is out of the way, and the trade looks forward to a bright future.

The Outlook in the Steel Trade.

The most striking phenomenon in the steel trade during the current year has been the constant decline in steel rails coupled with an advance in the raw materials. The statistics for the first half of the current year showed that the consumption of foundry and mill pig gained slightly over that of last year, the production having been 1,806,792 gross tons for the first six months of 1887, against 1,841,584 tons for the corresponding period this year. We know that since then there has been a notable improvement. We know, furthermore, that there is coupled with this a very important fact, the rapid growth of the use of steel for other purposes than rails. Add to this the no less significant circumstance that we imported far less raw material this year than we did in 1887. Roughly, we made 400,000 gross tons of Bessemer pig less in the first six months of 1888 than in 1887, but, on the other hand, we imported

142,000 tons less of pig iron. Probably not less than 100,000 tons of this was Bessemer pig. We imported 275,000 tons less of iron ore. Let it be assumed that the two represent together about 425,000 tons of iron ore mined at home instead of abroad. Now, the falling off of 400,000 tons of domestic Bessemer pig produced would represent a decline of the demand upon our mines of say, 650,000 tons. As shown above, lessened imports compensate for 425,000 tons thereof, leaving only, roughly, 225,000 tons less of domestic ore called for by our furnaces.

Let us regard the matter in another light. It is true that the production of rails fell off from 1,023,320 tons during the first half of 1887 to 692,197 gross tons for the first six months of 1888, a decline of 331,123 gross tons. These are the figures of Mr. James M. Swank which include all the mills. Those of the Board of Control of the Rail Association stood, for shipments, 907,351 tons and 585,558 tons, a decline of 321,793 tons. The last data up to October 1st are: Shipments in 1887, 1,390,825 tons; in 1888, 921,363 tons, a falling off of 469,462 gross tons. It is, therefore, safe to say that up to October 1st the quantity of rails produced had declined by 475,000 tons. This is sure to be swelled to 600,000 tons by the end of the year; but we imported 137,500 gross tons of rails last year, while this year we shall import not more than 67,500 tons, leaving the deficit 530,000 to 550,000 tons. To offset this we must note that the imports of steel blooms, slabs and billets are not likely to be more than 100,000 tons, if it does reach that figure, as compared with 310,000 tons last year. This would leave a deficit of about 300,000 tons of steel, considering the lessened imports of wire rods, &c. Against this quantity we must write off the increased amounts of steel going into nails, shapes, plates, &c., not affected at all by the cessation of imports of the cruder materials.

It will be seen that it would be very dangerous to draw direct conclusions from the condition of the rail trade upon that of the raw materials entering into it. They have been relatively benefited more from a restriction of imports of iron ore, pig iron and crude steel. That particular part of the ore producers and pig-iron manufacturers marketing material suitable for Bessemer purposes may find the demand from other quarters grow to such dimensions that they will be relatively independent of the rail manufacturers. The dominating influence of the latter may be less prominent. It will not take a very great development of the demand for barb wire, nails, plates and shapes to bring orders enough to the Lake mines and the other Bessemer ore producing districts to crowd them up to the record of 1887, and above it. The unexpectedly favorable result this year, so far as tonnage is concerned, was due to the very circumstances to which we refer. It is therefore not beyond the possibilities that we may have a very active demand for Bessemer ores for 1889, in spite of a slack year for rails. In other words, it is a contingency which the trade should keep in view, that ores and freights might be advancing in spite of a stationary market for steel rails.

The opinion is often expressed in trade circles that if the next were only a normal year for rails, say with a mileage of 8000

to 9000 miles, the demand thus created, added to that already existing outside of railroad circles, would cause a very rapid rise in values. There is nothing to hinder it so far as the foreign markets go. They are moving along in a satisfactory way independently of us. Besides, freights all over the world are high, so that thus an additional feature is added to the security of our position.

The Ericsson Submarine Torpedo Gun.

Now that so much attention is centered in the building up of a new United States navy and in the development of appliances of modern destructive warfare, it is not without interest to trace the history of some inventions in this line which have been made in recent years, but which, so far as is known, have never been given much opportunity to practically demonstrate the claims of superiority made for them. Some of them, it is true, have been so manifestly absurd as to make more than a brief examination of them a waste of time, while others have contained the germs of practically successful machines, and still others, from the start, commended themselves as appliances which promised immediate success, but which, from a variety of causes, have been allowed to remain unused. Perhaps the most striking example of this is to be found in the submarine torpedo gun of the veteran engineer, Captain Ericsson. The merits of this weapon have, at different times, been demonstrated in the boat Destroyer, built by Captain Ericsson himself, and it seems strange that no provision was made long ago for its use in our navy. Favorable action by Congress, so far as the adoption of the plans of the Destroyer were concerned, would have not only secured a formidable means of offense and defense, but would have been but a just tribute to its illustrious designer.

No doubt there are some of our readers who recall the fact that some two or three years ago one of Captain Ericsson's submarine guns was built at the Delamater Iron Works, at New York, for the English Government. We watched it in its different stages of construction, and witnessed some of the tests before shipment. Since then nothing has been said of it. English papers chronicled its safe arrival in England and referred to the test firing to which it was to be subjected; but that was all. It may, therefore, be of interest to say now that through injudicious management on the part of the English Board of Officers, the explosive charge of one of the projectiles, after a few shots had been fired, became ignited before the projectile had cleared the gun. Its destruction completely put an end to all further experiments. Since that time, so far as we know, nothing further has been done with it. Through a peculiar coincidence the accident occurred at about the time that Congress was considering the advisability of building a number of vessels of the Destroyer type, a circumstance, which though little known has not unnaturally suggested the possibility of some connection between the unfortunate result of the blundering English trials and the failure of Congress to provide for the acceptance of Captain Ericsson's plans. Be that as it may, the gun, in our opinion, still stands unrivaled as a

means of torpedo discharge, and has, moreover, been warmly advocated by many prominent authorities, among them Admiral Porter. Further effort should be made to bring it into service.

The World's Production of Pig Iron and Steel.

We have recently been in receipt of several inquiries on the relative production of iron and steel in this country and abroad. As our readers generally will be interested in the statistics on this subject, we present herewith the most authentic figures which have been issued by Government officials and trade organizations in the leading countries of the world. In the production of pig iron Great Britain retains the lead over all competitors, although she is now being closely pressed by the United States. Germany is third in the list, but far below the two leaders. France is fourth. Belgium is fifth, but there is little difference between her and Austria-Hungary, the sixth. Russia is seventh, and Sweden eighth; these two countries being also neck and neck. Spain is the only other country whose pig iron statistics are worth separate enumeration. All other countries of the world, it is estimated by statisticians, do not together produce over 200,000 tons of pig iron annually. Taking the highest known production of each country, we have the following table in gross and metric tons, according to the system of weights adopted as the standard in the countries specified:

Maximum Pig Iron Product.

Countries.	Years.	Tons.
Great Britain.....	1882	8,586,680
United States.....	1887	6,417,148
Germany.....	1887	3,907,364
France.....	1883	2,069,430
Belgium.....	1883	783,433
Austria-Hungary.....	1884	734,346
Russia.....	1882	498,400
Sweden.....	1885	464,737
Spain.....	1885	159,225
Other countries.....		200,000

The aggregate of 23,820,763 tons is the utmost production of pig iron of which the united countries of the world have as yet shown themselves capable. Of that production Great Britain's share was 36 per cent., and that of the United States was 27 per cent. Comparing the figures of the other countries it will be found that the United States produced as much as Germany, France and Russia combined. Great Britain, however, is not keeping up her heavy output of 1882, her production having declined steadily from that year until 1886, when she produced but 6,870,665 tons, or only 453,517 tons more than the output of the United States in 1887. She rallied in 1887 to 7,441,927 tons, which is still far below the figures of 1882. Taking the actual production of each country in a given year the American Iron and Steel Association gives the world's production of pig iron as follows from 1800:

Year.	Tons.	Year.	Tons.
1800.....	825,000	1880.....	17,950,000
1830.....	1,825,000	1885.....	19,100,000
1850.....	4,750,000	1886.....	20,385,571
1870.....	11,900,000	1887.....	22,170,919

In the production of steel the United States leads the world, having surpassed Great Britain in 1887. All kinds of steel are included in this comparison, the basis of which is crude steel or ingots, and not finished forms, statistics of which would

be impossible to collect. According to the American Iron and Steel Association, the following table embodies the latest authentic reports from each country, gross and metric tons being used according to the custom of the country specified:

Country.	Year.	Tons.
United States.....	1887	3,339,071
Great Britain.....	1887	3,170,507
Germany.....	1889	1,685,400
France.....	1887	440,956
Austria-Hungary.....	1887	276,920
Russia.....	1882	225,140
Belgium.....	1887	206,350
Sweden.....	1886	78,231
Spain.....	1886	25,000
Italy.....	1886	23,760
Other countries.....		35,000
Total.....		9,506,335

The United States produced 35 per cent. of this aggregate and Great Britain's share was 33 per cent. These two countries are thus closely matched in the production of steel, while Germany, third in order, falls very far behind, but is still a long distance ahead of France, which ranks fourth. In the production of Bessemer steel rails, a finished form of some of the steel included in the above table, the United States far surpasses any other country, having rolled 2,101,904 tons in 1887, against 1,021,847 tons rolled by Great Britain in the same year. This comparison gives the greatest annual production ever achieved by the United States, but Great Britain's heaviest year for steel rails was 1882, when she rolled 1,235,785 tons. As no other country makes as many rails as Great Britain, these statistics amply establish the supremacy of the United States in the steel-rail manufacture.

It would be of much interest to note the comparative standing of the various countries of the world in respect of other forms of iron and steel than those enumerated, but the figures are wanting for everything except rolled iron. In 1887 the United States turned out 2,311,160 tons of iron rolled in plates, sheets, bars, &c., while Great Britain rolled but 1,701,312 tons of puddled iron in the same forms. In castings and other miscellaneous iron products the United States undoubtedly leads, as cast iron is used here for a great many more purposes than abroad. The statistics showing the consumption of pig iron in the several countries would go far toward establishing the correctness of this statement, but into that phase of the subject we will not now enter, although from such a standpoint the United States would be incontestably proved to be the leading iron country of the world.

In his paper on "The Distribution of Internal Friction of Engines," presented two weeks ago before the American Society of Mechanical Engineers, Professor Thurston, among other sources of loss of power from friction, referred naturally to the friction of the piston and its rod. He characterized it as a decidedly variable fraction, varying not only with the class of engine, but also in the same engine when differently handled. It is not surprising that this should be so, especially when we consider the large variety of packings and packing rings with which the market is supplied, and the uncertain measure of tightness and protection against leakage afforded in the person of the average attendant. It has been remarked, facetiously, perhaps, but not wholly without foundation, that the first thing which

a new engineer will do with an engine is to set out the packing rings, and that similarly the one unfailing remedy for any slight trouble with an engine is the same setting out of these rings. That the friction of a piston should be enormously increased by such tinkering with an engine is but natural, and instances are not unknown where machinery had become almost inoperative from this cause, the friction from unduly screwed-down stuffing-boxes, moreover, adding to the difficulty. Under the circumstances the unpacked pistons and rods which are now gradually coming into use are to be welcomed as important advances in engine construction.

The World's Vessel Tonnage.

A few years since Lloyds' Register succeeded in collecting in the *Universal Register* reliable statistics of shipping for the entire world. Although not absolutely complete, they are so nearly correct that they may be used without hesitation as the basis of deductions relating to business interests. To the particular trades in which we are interested, the tonnage of the world, as affecting ocean freights, is a matter of direct and often vital importance. During the last few months those who are dependent upon foreign markets for a whole or a part of their supplies of raw material have heard a good deal of rising freights. It has come largely in the nature of a surprise to many, and the points affecting the supply of tonnage do not appear to be generally understood. The figures gathered by the authority alluded to furnish some cue to the rapid change from unremunerative rates to relatively high freights.

The total tonnage of all seagoing vessels for all countries of the world was 21,507,856 tons in 1885. It declined to 20,943,650 tons in 1886, and underwent a further diminution to 20,765,645 tons in 1887, the number of craft being in the three years in the order named: 35,408 in 1885, 35,124 in 1886, and 33,200 in 1887, all vessels under 100 tons net register being excluded. Roughly speaking, the tonnage is divided equally between sail and steam, the decline being due entirely to the decadence of sailing marine. It declined from 11,216,665 tons for 25,766 vessels to 10,402,807 tons for 25,155 vessels in 1886, and to 9,820,492 tons for 23,310 ships in 1887. So far as the steamer fleet of the world is concerned, new construction has done little more than filling the gaps caused by losses. In 1885 9642 steamers had a tonnage of 10,491,241 tons. In the next year the totals foot up 9969 steamers with a tonnage of 10,531,703. In 1887 the number declined to 9890, but the tonnage rose to 10,918,153 tons.

With such a steady falling off going on in the conveying capacity of the world's merchant marine the sudden raising of rates was not surprising as soon as anything like a fair amount of goods began to move. The shipyards of Great Britain have already responded to a sudden influx of orders for new tonnage, and the steel mills have felt its quickening influence. Good authorities are beginning to question whether the new tonnage on the stocks will not be fully adequate to bring down freights to a more reasonable level. For

the moment vessel owners are making money, after a long spell of unremunerative business.

Our own country has not changed its position much in the ranks of the ship-owning nations of the world. Taking the leading nations, the figures stand as follows:

Sailing Vessels.			
	No. of vessels, 1885.	No. of vessels, 1886.	No. of vessels, 1887.
Unit'd Kingdom Colonies.....	2,767	2,559	2,402
Total.....	7,881	7,440	6,514
United States..	3,542	3,427	3,242
Norway.....	3,369	3,200	3,010
Germany.....	1,794	1,678	1,485
Italy.....	1,674	1,679	1,508
Sweden.....	1,130	1,079	1,066
France.....	1,194	1,082	908
Greece.....	1,251	859	845
Russia.....	931	944	1,001
Tonnage.			
	1885.	1886.	1887.
Unit'd Kingdom Colonies.....	3,248,807	2,846,148	2,658,518
Total.....	13,766,662	1,097,147	1,069,562
United States..	4,625,469	3,943,295	3,698,080
Norway.....	1,587,140	1,530,490	1,442,113
Germany.....	1,351,986	1,305,337	1,264,892
Italy.....	806,197	769,977	727,975
Sweden.....	705,283	712,857	619,946
France.....	331,061	312,821	297,282
Greece.....	318,712	286,635	264,186
Russia.....	289,385	209,525	209,456
Total.....	270,940	271,849	284,839

The position is not so very bad in the case of sailing vessels, but it is pitiable when comparing our steamer tonnage with that of other ship-owning nations:

Steamers of Leading Nations, Number:			
	1885.	1886.	1887.
United Kingdom Colonies.....	5,020	5,057	4,979
Total.....	692	735	736
France.....	508	509	481
Germany.....	559	579	601
United States..	388	400	398
Spain.....	401	401	380
Italy.....	153	173	192

Steamers of Leading Nations, Tonnage:			
	1885.	1886.	1887.
United Kingdom Colonies.....	6,162,117	6,169,065	6,468,936
Total.....	377,506	426,806	394,579
France.....	6,539,623	6,595,871	6,863,515
Germany.....	738,141	742,662	731,732
United States..	603,917	654,814	659,660
Spain.....	495,862	508,677	505,977
Italy.....	361,006	356,912	388,074
Total.....	195,305	230,342	265,513

It will be observed that there has been but little change in the relative position of the leading ship-owning countries of the world.

Car-Building and the Bar Iron Trade.

The car famine in the West is now beginning to bear fruit in the shape of increasing orders for new freight cars which are being placed among the car-builders. The more prominent railroad companies have led off with orders for 1000 to 1500 cars, and small lines are purchasing from 100 to 500 cars each. As car-building improves, greater activity is perceptible in auxiliary branches of industry, including some departments of the iron trade. A single inquiry recently in the market called for 2000 car axles, and this is regarded as merely the beginning of a heavy demand which will crowd the axle forges with work this winter. The car-wheel foundries will also be correspondingly active, which will be a welcome change from their condition of dullness the past summer. As a standard freight car requires about 2 tons of bar iron for its construction, it will be seen that the rolling mills will also participate heavily

in the benefits accruing from activity among the car-builders. Orders from this source will come at a good time to sustain the bar iron market, but if they should expand to very considerable proportions they will not only keep prices firm but may also cause an advance.

The Western bar mills are now making deliveries on fairly good time, showing that they are catching up with their booked orders, but throughout September and October complaints of their derelictions in this respect were numerous. Jobbers' stocks in Chicago were drawn on by the larger consumers to a considerable extent, because they could not get sufficiently prompt deliveries from the mills. Even now the large Chicago warehouses are very short of certain sizes which have been in urgent demand, and it will take some time to restore stocks to their normal condition, with the mills as busy as they are on contract work. An unprecedented quantity of bar iron is now going into agricultural implements, and the general country demand is most excellent, so that the deficiency in the consumption of bar iron by railroad repair shops has been almost unnoticed. The effect of car orders for bar iron will thus be more immediately felt than if a large part of the bar mill capacity was unemployed.

American Enterprise in Chili.

The recovery of Chili from the prostration of a destructive war has been so rapid and so substantial that already the Government finds itself with a surplus of \$20,000,000 in the treasury and prepared to engage in grand schemes for internal improvement. American engineers have been in the country since last May, carefully surveying the most feasible routes for railway construction, with the design of bringing the elevated tablelands of the interior into close communication with ports on the seacoast, and thus opening the way for an indefinite expansion of foreign commerce. The latest advices show that the Government has acted favorably upon the proposition by voting the entire amount required by the estimates of expenditure, the President confirming the act by affixing his signature to the bill. A feature in the transaction that possesses special significance when viewed from the American standpoint, and one that may reasonably be regarded with peculiar satisfaction by citizens of the United States, is the fact that American contractors were successful in securing the prize, despite the fierce competition of rivals in Europe. The amount involved is no less than \$35,000,000 or upward, no inconsiderable portion of which will be distributed among our various industrial establishments in the purchase of bridge-work, locomotives and rolling stock, it being expressly stipulated by the contractors, who are the well-known firm of Comegys & Lewis, associated with the Union Bridge Company, that these all must be supplied by manufacturers in the United States. Apart, however, from considerations of a merely pecuniary nature, there is reason for complacency in the assurance, tacitly conveyed, that henceforth the international relations of the two countries concerned must become more cordial and more intimate, thus aiding in the development of an American sentiment in distinction from

a policy purely European, and which, under certain supposable circumstances, might become arrogant and aggressive on this Western Hemisphere.

Chili has an auspicious future. Her inhabitants have not inaptly been called the "Yankees of South America." Having now an established Government and a restored national credit, and having extended its territory down to Terra del Fuego, embracing what was formerly known as Patagonia—altogether a shore line of 2270 miles—at the same time spreading eastward to the boundaries of the Argentine Republic, she seemed only to need a complete system of railway communication between the interior and the seaboard to insure a development of resources rich, varied and abundant. What the renowned American contractor, Mr. Meiggs, sought to do for Peru in her prosperous days, the rising Republic of Chili proposes to secure in her own behalf through similar instrumentalities.

The Blast Furnaces on November 1.

Again the West and South show a notable increase in the quantity of pig iron being currently made, the indications pointing to further growth. As the figures given below show, the anthracite furnaces have practically remained stationary:

Anthracite Furnaces November 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	26	10	2,919	16	3,896
New Jersey.....	14	4	1,459	10	3,090
Spiegel.....	3	3	233	0	0
Pennsylvania:					
Lehigh Valley...	46	26	9,456	20	4,630
Spiegel.....	1	1	57	0	0
Schuylkill Valley.	35	19	6,468	16	3,040
U. S. Susquehanna Valley.....	18	9	2,851	9	1,630
Lebanon Valley...	15	12	5,984	3	1,508
L. S. Susquehanna Valley.....	23	11	4,218	12	3,468
Total.....	181	95	33,545	86	21,282

For a year past our records show the following:

	Furnaces in blast.	Capacity per week.
November 1.....	95	33,545
October 1.....	95	33,528
September 1.....	92	33,541
August 1.....	93	33,397
July 1.....	92	32,478
June 1.....	90	32,418
May 1.....	96	31,903
April 1.....	94	30,436
March 1.....	94	28,598
February 1.....	97	29,989
January 1.....	118	38,206
December 1, 1887.....	122	39,487
November 1.....	124	40,628
October 1.....	123	39,440
September 1.....	125	38,338
August 1.....	129	37,490
July 1.....	138	40,742

What changes there have been among the anthracite furnaces have practically compensated for one another. In New York one of the Port Henry furnaces, No. 3, has gone out for repairs. In New Jersey Musconetcong which was blown in lately is making more iron by 25 to 50 tons per week than in any previous campaign, producing 555 tons in one week. The Schuylkill Valley is turning iron out more heavily. Edge Hill and Lucinda are at work, and Montgomery, Mount Laurel and Norway will be added in November. In the Lehigh Valley Lehigh Furnace resumed. The two Saucon furnaces of the Thomas Iron Company have been put on magnetic ores, and are making mill iron altogether. In the Upper Susquehanna Union was about to blow in early in the month. In the Lebanon Valley one of the

Bird Coleman furnaces is out for repairs, Lochiel is idle. In the Lower Susquehanna Valley the Pennsylvania Steel Company have blown out in one of their furnaces. The probabilities point to a slightly increased make for the anthracite furnaces during the current month.

A very important increase in the capacity at work has taken place in the coke furnaces, the figures showing the following:

The Coke Furnaces November 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week, Gross tons.	Number out of blast.	Capacity per week, Gross tons.
New York.....	3	1	932	2	1,832
Pennsylvania:					
Pittsburgh district.....	19	18	19,254	1	700
Spiegel.....	1	1	536	0	0
Shenango Valley.....	19	14	9,363	5	2,545
Juniata and Conemaugh Valley.....	20	10	6,005	10	3,340
Spiegel.....	2	1	438	1	200
Youghiogheny Valley.....	5	4	1,651	1	600
Miscellaneous.....	3	3	1,543	0	0
Maryland.....	2	1	250	1	120
West Virginia.....	6	4	2,334	2	400
Ohio:					
Mahoning Valley.....	14	11	8,663	3	2,140
Central and Northern.....	17	14	9,870	3	1,310
Hocking Valley.....	14	5	1,530	9	1,980
Hanging Rock.....	11	7	1,620	4	863
Indiana.....	2	1	222	1	200
Illinois.....	13	9	10,505	4	3,020
Michigan.....	1	0	0	1	250
Wisconsin.....	4	2	1,055	2	1,352
Missouri.....	6	1	488	5	2,130
Colorado.....	1	1	465	0	0
The South:					
Virginia.....	11	8	3,675	3	1,853
Kentucky.....	4	4	997	0	0
Alabama.....	20	10	8,833	4	1,900
Tennessee.....	11	9	4,225	2	800
Georgia.....	2	1	501	1	259
Total.....	201	146	94,695	65	27,904

	No. of furnaces.	Capacity per week.
November 1, 1888.....	146	94,695
October 1.....	137	85,461
September 1.....	133	81,082
August 1.....	122	74,855
July 1.....	121	69,543
June 1.....	128	75,427
May 1.....	130	75,815
April 1.....	128	70,644
March 1.....	128	68,862
February 1.....	136	73,912
January 1, 1888.....	143	83,101
December 1, 1887.....	144	88,835
November 1.....	151	90,459
October 1.....	152	89,123

The increase in the capacity blowing is due primarily to added plant in the South, to a greater number running elsewhere and to heavy product, notably in the Mahoning Valley.

Every furnace except one is now in operation in Allegheny County, the exception referred to being the Soho, which will go in this month. During October Edith and Lucy No. 2 went into blast. In the Shenango Valley the product has been heavy, on the whole, and practically the district is working close up to full capacity. The same is true of the Allegheny and Youghiogheny valleys, and of those furnaces which we group among the miscellaneous, Centre having resumed on the 20th ult. On the Juniata and Conemaugh, the only fact worthy of notice is that the Cambria Iron Company have resumed the manufacture of spiegeleisen, though not at the East Conemaugh furnace. In West Virginia Top Mill is again producing. In the Mahoning Valley the output has been very heavy, aggregating 38,649 tons, against 34,829 tons in September. Nearly every furnace in the valley has done better than its average, Anna, Grace, Girard, Hazelton, Hubbard and Mary notably so. Anna averaged 907½ tons for three consecutive weeks, consuming only 2116 pounds of coke to the gross ton of metal, an excellent result for its limited facilities. Mary made the exceptional record of turning out No. 1 Ohio Scotch to the extent of 92½ per cent. A number of producers note specially the active and strong condition of the market. Andrews & Hitchcock write that the de-

mand for foundry iron is so urgent that if they had bought ore for two furnaces they would blow in their second Hubbard, as they find it impossible to supply the wants of all their customers. The reports from Central and Northern Ohio similarly indicate a heavy production and a good demand. No. 2 Cherry Valley is to begin work in a few days. In the Hocking Valley one of the Floodwood furnaces is to blow in soon, otherwise there have been no changes, minor changes only have taken place in the Hanging Rock region.

In Illinois North Chicago is now running four stacks, but, on the other hand, No. 2 Union went out on the 8th ult. In Wisconsin Mayville blew in, while in Missouri one of the Missouri Company's furnaces went out, the other being blown in soon after.

No changes have taken place in Kentucky or Georgia. In Virginia, Lynchburg is to blow in on the 10th, the furnace having been remodeled. In Alabama, however, Gadsden, "B" Sheffield and Birmingham, and one of the North Birmingham (Sloss) blew in, and No. 2 Sloss resumed on the 4th ult. In Tennessee Citico is doing heavy work, and Nashville is running on coke. One Rockwood and one South Pittsburgh are the only idle furnaces. Returns from the charcoal furnaces received thus far indicate that there have been only minor changes.

Corliss Valve Gearing.

Speaking of some water-works engines recently built by Messrs. E. P. Allis, of Milwaukee, Wis., *Industry*, a San Francisco journal says:

We do not indorse the Corliss valves used on the Milwaukee engines. These involve a lot of link and pin work, dash pots and other contrivance that might be dispensed with in the case of a slow-moving engine working against a uniform load. In San Francisco practice the Corliss valve gearing has been kept in its most simple form, and is in some degree, or in the same degree, better than when new detail is added. Messrs. Hicks, Hargreave & Co., of Bolton, England, for example, have in their attempts to improve or modify Corliss gear, provided apparatus that reminds one of a Jacquard loom. We are not among those who deem the Corliss system of valve gearing essential parts of a good engine. The intended functions are well performed and the valves are durable. Of this there is no doubt, but the actuating mechanism is extensive and "trappy."

The *Railway Age* says: "While few of the principal railroad companies have been doing much new building, still work has been quietly in progress on hundreds of short lines all over the land, and already new track has been laid this year in every one of the 47 States and Territories, with the exception of Rhode Island, Utah and Nevada, and almost 6000 miles of main line have been added to the railway system of the country since January 1 last. During the first ten months in the year main line tracks were laid in 44 States and Territories on 280 lines to the aggregate of 2430 miles in the four months since our last statement. Although comparatively little grading is done in the greater part of this country after November 1, still the last two months of the year are always marked by a very considerable amount of track laying, and this will be the case this year, especially if the weather continues favorable. Of the 280 lines here reported upon at least 75 are still in process of construction, while some track will be laid on a few other roads. Looking the field over we venture to estimate that from 1200 to 2000 miles more of new track

will be added to complete the record of last year, making the total new railway mileage of 1888 between 7000 and 8000 miles."

Propulsion of Ships by Air Propellers.

At the last meeting of the British Association for the Advancement of Science, a paper was read by Mr. H. C. Vogt, suggesting the propulsion of ships by means of revolving sails acting in the air. The advantage to be gained over the ordinary form of screw propulsion were summed up as follows:

(1) A saving amounting in engine power by eliminating the disturbing action of the screw; (2) the form of the ship could be determined with reference to least resistance and seaworthiness only, and the division in water-tight compartments could be complete; (3) the change in trim will be less disadvantageous when the power is applied above the deck than below the center of gravity; (4) the vibrations caused by the screw propeller, which are destructive to the ship and most unpleasant to those on board, will be avoided; (5) the proposed air propeller will utilize the natural wind power.

The air propeller, as explained by Mr. Vogt, is, in its outer shape, somewhat similar to the ordinary water screw, with sails or blades made of thin sheet steel, having the greatest width near the circumference. The pitch of the blades is capable of being varied in order to utilize the power of the wind, because nearly 80 per cent. of the winds, the whole compass round, augment the thrust of the propellers.

In order to avoid vibrations, the blades of water propellers are tapered toward the tips or near the circumference, whereas the blades or sails of the air propeller should be broadest near the circumference, because the air, being elastic, causes no vibrations. It is found in practice that for equal numbers of revolutions, equal intensity of thrust, engine power and speed, the area of an air propeller should be about twelve times that of the water screw, but this ratio decreases somewhat as the size of the ship increases.

On Friday, the 2d inst., the freight rates from Pittsburgh to Galveston and Houston, Tex., were advanced. Iron nuts, bolts, washers, rivets and staples were advanced from 54 to 56 cents per 100 pounds. The new class rates are: First-class, \$1.50; second, \$1.25; third, \$1.05; fourth, 86 cents; fifth, 78 cents; class A, 83 cents; B, 75 cents; C, 67 cents; D, 55 cents; E, 50 cents. They were formerly, \$1.50, \$1.25, \$1.05, 86 cents, 82 cents, 74 cents, 67 cents, 55 cents and 50 cents. The new figures are issued under a new classification, revised for Texas business.

The Durant Crescent route has sent out its Tariff Sheet No. 9, on rates of pig iron from Southern furnaces. By a printer's error, the first sheet sent out was wrong, and a second corrected one has been issued.

The Canadian Geological Survey, in its annual report on the mineral and metal production of the Dominion for the year 1887, estimates an output of the year at \$15,000,000. Of the aggregate exports, estimated to have been about one-third of the total product, the United States was the purchaser of 78 per cent., while England took the next largest share, 15 per cent., and Newfoundland, Germany, Sandwich Islands, Australia, Argentine and the East and West Indies followed in the order given.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington street, CHICAGO, November 5, 1888.

Business has been very decidedly curtailed during the past week, the impending political struggle absorbing the attention of all classes.

Pig Iron.—The market generally has been very dull, the only sales of consequence reported having resulted from the closing of negotiations begun some time since. Among these is a lot of several hundred tons of Lake Superior Charcoal which goes to the East to be manufactured into Car Wheels and malleable Castings. The other sales were of Coke Irons to the foundry trade. A large number of consumers have stated that they would defer purchases until after election unless positive bargains were offered them. But just now bargains in Pig Iron are extremely rare, although reports are more frequent of concessions being offered on Southern Irons, particularly Gray Forge. It is asserted that any weakness in that direction is only for early delivery, and that contracts to be filled in 1889 would not be made on the same basis. The scarcity of high numbers of Lake Superior Charcoals still continues, as the furnaces are turning out a smaller proportion of those grades than usual. The Calumet Furnace is now ready to be blown in, all the repairs having been completed. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$20 @ \$21; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$18 @ \$18.50; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband), No. 1, \$20 @ \$21; other Ohio Soft Irons, No. 1, \$17 @ \$18; Lake Superior Coke, No. 1, \$18 @ \$19; No. 2, \$17 @ \$18; No. 3, \$16 @ \$17; Southern Coke, No. 1 Foundry, \$17.50; No. 2 Foundry and No. 1 Soft, \$17; No. 3 Foundry and No. 2 Soft, \$16.25; Gray Forge, \$15.50.

Bar Iron.—As work among the car-builders increases the demand for Bar Iron improves from that source. A few good specifications made their appearance last week and much larger orders are shortly expected. Bids on Car Iron range from 1.70¢ to 1.75¢ flat, f.o.b. Chicago. The carload price for Common Iron from mill is 1.75¢, half extras, f.o.b. Chicago, but large lots and good specifications could be placed a little lower, depending on the condition of the mill quoting. As the mills generally seem to have plenty of work, no break in prices is indicated, but, on the contrary, a firmer feeling is noticeable with the increasing business in sight. Jobbers quote small lots from store at 1.90¢ @ 2¢, according to quantity and quality, but their stocks have been badly broken of late, and some of the largest warehouses in the city are at present unable to supply a complete assortment of sizes.

Structural Iron.—Business in this line has been very quiet. Mill orders rule as follows, f.o.b. Chicago: Angles, 2.20¢ @ 2.25¢; Universal Plates, 2.25¢; Tees, 2.55¢ @ 2.65¢; Beams and Channels, 3.40¢. Small lots from store are quoted at the following rates: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—A fair business has been done by the local merchants, but it was mainly confined to small lots. Some large enterprises are on foot involving the consumption of considerable quantities of Plates, and the outlook is decidedly encouraging. Prices are firm, quotations from store

continuing as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60¢ off.

Sheet Iron.—The mills are quoting slightly lower prices, as they begin to see daylight through their orders, and 3¢ at mill for No. 27 is now named by most of them, although few are prepared to make early deliveries as yet. Jobbers are having a light demand, which is attributable to the very mild weather recently prevailing. A cold snap is badly needed to impart activity to the retail Stove trade, from which their demand comes. They quote small lots of No. 24 at 3.20¢, Nos. 25 and 26 at 3.30¢, and No. 27 at 3.40¢, with concessions to best buyers.

Galvanized Iron.—New business has again fallen off among manufacturers' agents, but the mills are still far behind with their orders, and stocks in warehouses are very badly broken. Small lots are quoted at 60¢ and 5¢ off for Juniata, and 60¢ and 10¢ off for Charcoal.

Merchant Steel.—Small lots of Open-Hearth Spring Steel are being sold at 2.70¢, but no large transactions have taken place in it. The demand for other forms of Steel has been quiet and association prices are as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Orders for 20,000 to 30,000 tons were placed among the local mills during the week, the greater part being for next year's delivery. More inquiries are in the market, but they are of such a character that some members of the trade fail to derive much encouragement from them, and are not looking forward to a year of any greater activity than the present one has been. It is very certain that prices will be decidedly less remunerative. In view of this some makers are disinclined to compete vigorously for business, believing that those who do not fill their order books now will get better rates next spring or summer. The nominal quotation is still \$30 for all deliveries.

Old Rails and Wheels.—Sellers of Old Rails are more plentiful than buyers just now, and prices are lower. A small lot, consisting of a few carloads, was sold at \$22.50, and several hundred tons were sold at the same price in the interior of the State. On other lots offered the best bids received were equivalent to about \$21.75, Chicago, which the sellers rejected, believing that a better demand will be experienced later in the season. The supply is understood to be quite heavy, but holders assert their ability to wait for better prices. Old Car-Wheels are evidently being sold to consumers direct by the railroad companies, very few of them passing through the hands of third parties. Prices are, therefore, difficult to quote, but they are worth \$19.50 @ \$20.

Scrap.—An inactive condition of the market is reported, very few sales having been made. Most of the mills and forges are well supplied with stock. City dealers are holding off for higher prices, which they expect to get after snow falls, if indeed a demand does not spring up after the election. Mixed Country Scrap is quoted at \$14.50 @ \$15. Selling prices of carefully selected Scrap are as follows, per ton of 2000 lb: No. 1 Forge, or Railroad Shop, \$20.50 @ \$21; Track Scrap, \$19.50; Horseshoes, \$20; Axles, \$26.50; No. 1 Mill, \$15.50 @ \$16.50; Pipes and Tank, \$12 @ \$13; Light Wrought, \$11; Cast Machinery, \$15; Stove Plate, \$12; Cast Borings, \$9.50; Wrought Turnings, \$12 @ \$12.50; Axle

Turnings, \$14; Coil and Leaf Steel, \$17; Locomotive Tires, \$15.50.

Hardware.—Wholesale merchants have experienced an excellent demand for Shelf Hardware. The very healthy condition of this branch of trade is shown by the large number of mail orders now being received, as they are much more numerous than usual. The election will naturally curtail business to some extent this week, but as soon as it is over it is expected that a resumption of the activity will occur and that it will continue up to at least the middle of December. In Heavy Hardware a quieter feeling prevails, purchases being made very conservatively and collections being less satisfactory than earlier in the fall. No material changes in prices are reported.

Nails.—A 10,000-keg order for Steel Nails from a point further West excited some interest in the local trade the past week, but generally speaking manufacturers' agents did little or no business. They quote \$1.90, f.o.b. Chicago, but concessions on this price are being offered by some sellers, and the impression prevails that a lower range of values will be established which will probably hasten the consummation of the long-contemplated combination. Small lots are sold, from store, at \$2.05, but this is shaded to best buyers. The continuance of mild weather has benefited the jobbing trade in Nails, as outdoor work is being prosecuted with vigor much later in the season than usual. Prices of Wire Nails are much firmer than those of Cut Nails, small lots selling at \$2.60.

Barb Wire.—Jobbers report an improvement in the demand, but no change in prices, continuing to quote small lots at 2.90¢ for Painted, and 3.60¢ @ 3.65¢ for Galvanized.

Pig Lead.—Prices have fluctuated within a narrow range during the week, between 3.70¢ and 3.80¢ but considerable quantities have changed hands, being taken directly for consumption. Refiners are indisposed to push sales at the lower figures, and the market, therefore, appears firm.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., November 6, 1888.

Business has been very quiet since date of our last report, but in view of the important election which will be decided within the next 24 hours, it could hardly be otherwise. Important transactions have been held in abeyance, both sides being satisfied to wait until the question is decided. Prices, however, have not weakened in the slightest, from which it is inferred that they might have been dearer if the usual demand had not been interfered with.

Pig Iron.—The feeling has been one of much steadiness, and makers have had no difficulty in disposing of all the Iron they could spare. In most cases prices have been maintained, while in some instances slight advances have been paid in order to secure certain brands or deliveries. But there is no quotable change anywhere, and for all practical purposes the market is just about as it was a week ago, although the firmness of holders leads to the opinion that it has more inherent strength than was generally expected. Sales of Foundry Irons have been chiefly in lots of 50 to 100 tons each, and ordinarily at prices ranging from \$17 to \$17.50 for No. 2 and \$18.50 to \$19 for No. 1, the bulk of the business being at the outside figures. Mill Irons have not been called for to any great extent, as they are usually taken in larger lots, thus making it more an object for buyers to see the result of the election before closing their

contracts. There have been a good many inquiries, however, and there is reason to believe that the demand will be large enough to absorb all the Iron that can be turned out during the balance of the year. For the present, therefore, prices are not likely to go below \$16 nor higher than \$16.50 @ \$17 at tide, a little one way or a little the other, according to developments during the next 24 hours. The market looks remarkably healthy and sellers appear to have entire confidence in values as above quoted.

Blooms.—There is a fair demand at quoted rates, which are unchanged, as follows: Nail Slabs, \$29 @ \$29.50, at mill; Billets, from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 per "bloom" ton of 2464 lb.; Foreign at tide, c.i.f., duty paid, \$30 @ \$31 for Nail Slabs; \$34 @ \$36 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—The demand has been quite strong up to this date and prices fully maintained. Quotations vary according to point of delivery, quality of Bars, &c., but \$29 @ \$30, f.o.b. cars at mill, seems to fairly cover both ends of the market. The volume of business has not been large, as the offerings were light and quotations very firm.

Bar Iron.—The demand has not been equal to that met with during the earlier portion of last month, although there is still a good deal of activity, especially at the city mills. Some outside concerns seem to be anxious for new business, to secure which they have manifested a little weakness in making quotations, giving buyers better terms than were expected a little while back. There may be a reaction, however, in course of a few days. For the present, at all events, there is nothing to indicate serious dullness, and the chances are that things will go in a few days as if there had been nothing whatever to divert attention from the ordinary routine of business. Prices, as we have said, are irregular, and in some instances have shown signs of weakness, but ordinarily 1.85¢ @ 1.95¢ is quoted, with concessions of possibly half a tenth or a tenth when the order was large or desirable as to specification of sizes, &c. Skelp Iron is steady but not active. Mills are full of work for some weeks, and buyers have not felt inclined to pay over 1.9¢ for new business, although 1.95¢ to 2¢ is asked.

Plate and Tank Iron.—There are no new features to notice in this department. Small orders have been numerous, and mills are nearly all busy on work of this class. Work that was somewhat confidently expected from the shipyards has not materialized yet, and it is not unlikely that there may be further delay, as regards at least one important contract; but, under any circumstances, there will be a fair degree of activity, as most of the yards are tolerably well filled up for the winter months. Prices are unchanged, as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—There is not much new business coming in at present, and some of the mills are beginning to complain of dullness in many of their departments. The outlook is not specially encouraging at present, although it is hoped that things will take a fresh start soon. Prices unchanged, as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel

Sheet Iron.—The demand has been very satisfactory and prices firmly maintained. Mills are taxed to their utmost capacity to keep up their assortment of sizes, and stocks in first hands are at an extremely low point. Quotations for best makes are about as follows:

Best Refined, Nos. 26, 27 and 28....3¼ @ 3½¢
Best Refined, Nos. 18 to 25....3 @ 3¼¢
Common, ¼¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28....4½ @ 4¾¢
Best Bloom Sheets, Nos. 22 to 25....4 @ 4½¢
Best Bloom Sheets, Nos. 16 to 21....3½ @ 3¾¢
Blue Annealed.....2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....62½ %
Common, discount.....67½ %

Merchant Steel.—The demand is well maintained at prices as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—There is a good deal of inquiry for Rails, and it is not unlikely that some important contracts will be closed, providing that the election is favorable. Both sides have been waiting. As regards consumption, the outlook is not encouraging, but in view of the very low prices quoted, and the comparatively high cost of production, it is quite likely that sellers will stand out for more money. Quotations are, at the moment, more or less nominal, \$28.50 at mill being an inside figure for large lots, and from that to \$29 for smaller orders.

Old Rails.—There is very little business to report in spot lots, buyers and sellers still being unable to come together. T's in store or for shipment are held at \$24, with buyers at from \$23 to \$23.50. Sales of spot lots have been made at \$24.75 for old English Trams, \$25 for American Streets, and \$24.50 @ \$25.50 for T's delivered at mills in the interior.

Scrap Iron.—The demand is well maintained, and sales are chiefly at about the prices quoted a week ago—viz.: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Nails.—The demand has been somewhat more active, and, while prices are still irregular and unsatisfactory, the feeling seems to be somewhat more hopeful. Lots from store are quoted at from \$1.90 to \$2, but (some brands) carload lots are quoted at extremely low figures for spot cash.

Wrought-Iron Pipe.—The demand is fully maintained, mills are all busy and likely to be for the balance of the year. Discounts as follows: Black Butt-Welded, 52½ %; Galvanized do., 42½ %; Black Lap-Welded, 62½ %; Galvanized do., 52½ %; Boiler Tubes, 60 %.

Geo. W. Schultz, formerly with Sites, Wheeler & Co., and later with J. C. Poulter & Co., has taken an office at 36 South Seventh street, Philadelphia, and embarked in the general Iron and Steel brokerage business as E. W. Schultz & Co. Mr. Schultz is also treasurer of the Electrical Construction Company, which concern makes a specialty of installing electric light plants and all kinds of electrical supply and repair work.

Pittsburgh.

Office of The Iron Age, 77 Fourth Ave.,
PITTSBURGH, November 7, 1888.

Business continues in a generally satisfactory condition, although it has been curtailed somewhat of late by the excitement incident to the national election.

Pig Iron.—The quietude noted for some weeks past continues, and the indications are that the market will rule steady during the remainder of the present year. Consumption continues large, but so is production, and the best-informed authorities predict that there will be no falling off in trade for some time to come, as the reports from nearly all points in this respect are of a most favorable character. Furnacemen would like to have a higher price for their product, but consumers aver that they are paying more now than they are warranted in doing, claiming that the raw material is bringing a higher price relatively than the finished product. There is scarcely a furnace in this district but is well sold up, some of them for several months ahead; but it is well to bear in mind, on the other hand, that many consumers have anticipated future wants and are out of the market, so that the one offsets the other. Prices have undergone but little change for several weeks, with the exception of Bessemer, which is off 50¢ per ton. We quote as follows:

Neutral Gray Forge.....	\$16.00 @ \$16.25,	cash.
All Ore Mill.....	16.75 @ 17.00,	"
White and Mottled.....	15.00 @ 15.50,	"
No. 1 Foundry.....	18.00 @ 18.50,	"
No. 2 Foundry.....	17.00 @ 17.50,	"
No. 3 Foundry.....	16.25 @ 16.50,	"
No. 1 Charcoal Foundry....	24.00 @ 24.50,	"
No. 2 Charcoal Foundry....	21.00 @ 22.00,	"
Mill Charcoal.....	19.00 @ 20.00,	"
Bessemer Iron.....	17.50 @ 18.00,	"

Ferromanganese.—Sales of 80 % Ferromanganese at \$56 @ \$57, and 20 % Speigel at \$27 @ \$28.50, cash.

Muck Bar.—There is more inquiry, and with but little offering the market is firmer and higher; we now quote at \$29 @ \$29.50, cash. A broker reports having an order to buy a lot of 1000 tons at \$29.25, cash, without having been able to get it. The above quotations show an advance of from 50¢ to \$1 per ton within a few weeks. It appears that nearly all the mills making a specialty of Muck to sell are sold ahead.

Manufactured Iron.—There is a continued good degree of activity, and the indications are that the mills, generally, will have about all they can do until the close of the present year. Prices remain unchanged. Bars, 1.80¢ @ 1.85¢; Plate 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢; all 60 days, 2 % off for cash; Skelp Iron, 1.80¢ @ 1.85¢ for Grooved, and 2.10¢ @ 2.12½¢ for Sheared. Trade in Skelp Iron usually commences to drop off this month.

Nails.—Are still quoted at \$1.90, 60 days, 2 % off for cash, although it is alleged that Wheeling, and possibly some other points west of Pittsburgh, are cutting the card rates. Pittsburgh makers refuse to cut below card rates, which at best, they claim, offer but a very small margin for profit.

Wrought-Iron Pipe.—There is a falling off in new business, as there usually is at this season of the year, but the mills are still busy and likely to be the rest of this month. No change in prices. Discounts on Black Butt-Welded Pipe, 52½ %; on Galvanized do., 45 %; on Black Lap-Welded, 62½ %; on Galvanized, 52½ %; Boiler Tubes, 60 %; 2-inch Tubing, 13¢ per foot, net; 5½-inch Casing, 40¢ per foot.

Old Rails.—There is a fair demand, but no quotable change in prices; sale of 500 tons, at \$24.75, and 2000 tons, at \$25.25. Standard American Tees may be fairly quoted at \$25 @ \$25.25. As soon as the winter season sets in the work of lifting will be suspended, and this leads to the belief that there will be a stronger market in the near future, although no immediate advance in price is looked for.

Steel Rails.—We continue to quote Heavy Sections at \$28 @ \$28.50, cash, at mill. We are cognizant of a sale at \$28.25. Some of the railroads have been

buying considerable sized lots, giving Old Iron Rails in part, on a basis of \$28.25 @ 28.50 for New Steel and \$25 @ 25.25 for old Iron Rails. The latter came within \$2.75 @ \$3 of paying for the former. We hear of one deal of the character in question involving 10,000 and another of 3000 tons. Almost any railroad company having Old Iron Rails can afford to buy new ones in the present condition of affairs, as the old are worth almost as much as the new.

Billets, &c.— There is a continued fair demand for Bessemer Steel Billets, and the market is reported steady at \$29 @ \$29.50, cash, at makers' mill. Nail Slabs, \$28.50 @ \$29; Domestic Bloom Ends, \$19; Domestic Rail Ends, \$19.25 @ \$19.50.

Railway Track Supplies.—There is a fair business, but prices remain unchanged. Spikes, 2¢ @ 2.10¢, 30 days, delivered; Splice Bars, 1.80¢ @ 1.85¢; Track Bolts, 2.85¢ with square and 2.95¢ with hexagon Nuts. The Spike works of Dilworth, Porter & Co. are still being operated by non-union workers, and the firm express a determination to hold on firmly to the position they have taken on this point, even if they do have some trouble; they have gone into it with a determination to win.

Merchant Steel.—There is a continued fair degree of activity, but no recent change in prices. Best Brands of Tool Steel, 84¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open-Hearth do., 2½¢.

Old Material.—There is a very fair business in the aggregate, although the demand is chiefly for small lots to supply immediate wants. No change in prices. Sales, No. 1 Wrought Scrap, \$21, net ton; Car Axles, \$26 @ \$27; Wrought Trimmings, \$14 @ \$15; Cast Scrap, \$16, gross; Cast Borings, \$12.50 @ \$13; Old Car-Wheels, \$20; Leaf Steel, \$19, net ton.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. }
CINCINNATI, November 5, 1888. }

Pig Iron.—Dullness has been the only feature of prominence in the local market for Pig Iron during the past week. There have been one or two large buyers in the market, however, and some contracts of moment, embracing a long delivery, are reported to have been closed. These transactions, however, were probably based upon special conditions and were the exception rather than the rule. There have been a number of inquiries, however, and "offers" based upon the political situation, but the result has been "nil." While there is generally a feeling of confidence and prices are well sustained, there is evidently a misgiving in certain quarters, and some concessions in prices have been made which point to a weaker tone. The easier feeling is said to be confined to sales for immediate delivery, while for future contracts full prices have prevailed. Prices are without quotable change. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @	\$17.00
Southern Coke, No. 2.....	15.75 @	16.00
Southern Coke, No. 3.....	15.50 @	15.75
Ohio Soft Stone Coal, No. 1.....	17.50 @	17.50
Ohio Soft Stone Coal, No. 2.....	16.50 @	16.00
Mahoning and Shenango Valley.....	17.50 @	18.50
Hanging Rock Charcoal, No. 1.....	20.50 @	22.50
Hanging Rock Charcoal, No. 2.....	19.50 @	22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @	19.50
Tennessee and Alabama Charcoal, No. 2.....	17.00 @	18.00
<i>Forge.</i>		
Strong Neutral Coke.....	14.75 @	15.00
Mottled Neutral Coke.....	13.75 @	14.00
Gray Forge.....	14.50 @	14.75
<i>(Car-Wheel and Malleable Irons.</i>		
Southern Car-Wheel.....	20.00 @	25.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Mal- leable.....	20.50 @	21.50

Nails.—There has been a fair jobbing trade and the market has ruled steady for all kinds. Jobbing prices are based upon 12d @ 40d, which sell at \$2.10 \bar{p} keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2.10 and Steel Wire Nails at \$2.75 \bar{p} keg.

Manufactured Iron.—The market has been quiet throughout the week and some cutting of prices has been complained of, but no changes have been made which are considered legitimate. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3.4¢ @ 4.4¢ $\frac{3}{4}$ lb.

Old Material.—There has been some inquiry for both Old Rails and Wheels, but few changes have been made in prices and transactions have been small. Old Rails are quotable at \$23, and Old Wheels at \$19 @ \$19.50 ^{per} ton, cash, here.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, November 5, 1888.

Pig Iron.—Nothing has occurred to change the general aspect of the market, which is moving along in a quiet and conservative manner. The general opinion seems to prevail that there will be but little change in the condition of the market whichever political party is successful in the election of their candidate, and it is, therefore, making but little difference in the calculations of our Pig Iron producers regarding the future. Demand and consumption keep about equal to the output, and but little speculation in Iron appears upon the surface. The Southern foundries are busier than usual, and consequently are requiring more than their usual quantity of Iron. The cause of this increased business is the very large crop of cane through South Carolina, Southern Georgia, Southern Alabama and Florida. It is estimated that the crop will exceed this year three times the amount of any previous year, consequently the demand for mills and pans is very great. There is also with the foundries a large increase in business in other lines, so at the present time they are having a heavy run of business. As prices have undergone no change, quotations are continued same as last.

Cleveland.

CLEVELAND, November 5, 1888.

Iron Ore.—The demand for Ore continues excellent, even the excitement incidental to a closing Presidential campaign failing to influence the market. About the only Ores still obtainable are a few lots of non-Bessemer. It has already been practically settled that but a very few tons of unsold Ore will be left on the docks at the close of navigation. Furnacemen do not look upon the present quotations as exorbitant, and negotiations are already pending for all-rail delivered Ore for winter use. All of the high grade Ore that can possibly be brought down by the lake carriers have been sold, with the possible exception of a few scattering loads that will be eagerly taken when offered for sale. Menominee Range non-Bessemer have advanced to \$4.50, at which price the closing sales for the season are being made. The transportation rate from Ashland has dropped to \$1.65 and this price will be paid for the few remaining loads to be shipped from that port. The total shipments to date slightly exceed 4,175,000 tons, a figure fully 500,000 in excess of the estimated business for the season at the opening of navigation. Including the 650,000 or 700,000 tons of unsold Ore on the docks at the beginning of the season, the total amount taken by the furnacemen this sea-

son will closely approximate 5,000,000 tons. The market for all non-Bessemer is very firm, and the persistent demand for the few thousand tons still to be used seems likely to result in advances within the next ten days.

Pig Iron.—Prices have neither advanced nor declined since last week's quotations were given. The market is, however, firm, and immediately after the election the volume of business will probably be satisfactory all around again. Both sellers and buyers are watching for the result of to-morrow's election with no small measure of apprehension. Upon the verdict given will, it is claimed, depend in a large degree the condition of the market for the next year. No large sales are reported for the past week, and none are expected before next week.

Scrap Iron—Old American Rails have been sold quite freely during the past week at \$23.75 @ \$24.25. There is very little inquiry for Old Wheels, but No. 1 Wrought is in good demand.

Manufactured Iron.—Sheets are again quite plentiful, and Bar Iron is in active demand at prices considerably in advance of former quotations.

Louisville.

LOUISVILLE, Ky., November 5, 1888.

Pig Iron.—The market has been quiet, with few large sales. These, however, have been at slight reductions in prices. Political excitement has caused some unsteadiness in Iron, and furnacemen are uncertain whether to sell at once for future delivery, or wait further developments. Foundries report orders ahead, and none are complaining of scarcity of work. The prices, however, at which contracts are taken show very little profit, and it is earnestly hoped that the market will soon show an advance. Old Rails and Wheels are quiet; Rails are worth \$23; Old Wheels, \$20.50. We quote as follows:

Southern Coke, No. 1 Foundry.....	\$16.75 @	\$17.75
" " No. 2	15.75 @	16.25
" " No. 2½	15.25 @	15.75
Hanging Rock Coke, No. 1 Foundry.....	17.00 @	17.50
Hanging Rock Charcoal, No. 1 Foundry.....	20.75 @	28.00
Southern Charcoal, No. 1 Foundry	17.75 @	18.25
Silver Gray, different grades	14.25 @	15.00
Southern Coke, No. 1 Mill, Neutral	14.50 @	15.00
" " No. 2	13.50 @	14.50
" " No. 1 " Cold Short	14.00 @	14.50
" " Charcoal, No. 1 Mill	15.50 @	16.25
White and Mottled, different grades	13.25 @	13.50
Southern Car-Wheel, standard brands.....	22.75 @	23.75
Southern Car-Wheel, other brands	19.00 @	21.00
Hanging Rock, Cold Blast	22.00 @	25.00
Hanging Rock, Warm Blast.....	19.00 @	20.00

New York.

Office of *The Iron Age*, 66 and 68 Duane street, }
NEW YORK, November 7, 1888. }

American Pig.—The week under review has been very quiet, very little business being done. We print elsewhere our monthly statistics, which show that the capacity of the Anthracite furnaces has remained practically unchanged, but that the South and West has notably increased. We continue to quote Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—The market is very quiet, with prices remaining: Coltness, \$21.50, nominally; Shotts, \$20.75 @ \$21; Langloan, \$21, and Dalmellington, \$20.25 @ \$20.50.

Bessemer Pig.—There have been large purchases of Bessemer Pig in Eastern Pennsylvania, one Eastern Rail mill alone buying about 15,000 tons of Cornwall Pig from Lebanon Valley furnaces at \$15 at furnace for the three numbers.

Spiegeleisen.—No business of any consequence is reported. Importers ask \$27

for German 20 % Spiegel, \$33 for 30 % and \$54 @ \$54.50 for 80 % Ferromanganese.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢.

Bar Iron.—We quote: Carload lots, half extras, 1.67½¢ @ 1.7¢ for Common; 1.7¢ @ 1.8¢ for Medium, and 1.8¢ @ 1.9¢ for Refined, with prices for fancy brands running up to 2.4¢ @ 2.5¢.

Steel Rails.—The 21,500 tons alluded to in the last issue of *The Iron Age* as having been purchased for the Vanderbilt system were not the total of the orders placed. We understand that the quantities purchased were 17,000 for the New York Central and West Shore, 8500 tons for the Lake Shore and Pittsburgh and Lake Erie, 6500 tons for the Michigan Central, 5000 tons for the C. C. C. and I. and 3000 tons for the Nickel Plate, a total of 40,000 tons. Three-quarters thereof, the Western business, went to Pittsburgh and Chicago mills, the former taking the bulk of it. We hear of additional transactions east of the Allegheny Mountains and South, aggregating between 30,000 and 40,000 tons, by two mills, one Western and one Eastern, at private terms. It is generally believed in the trade that the price named for a part of the Vanderbilt order by the new Pittsburgh mill was considerably lower than any given thus far. Whether or not the sale establishes the price at the low level reached must depend upon the eagerness of the newcomer for business and upon his ability to turn out product during the first six months of 1889. If a vigorous contest is made for business some demoralization is considered inevitable. On the other hand, work is coming up from unexpected quarters. Thus the receiver of a large South-western road is in the market for 50,000 tons of Rails, some of them for immediate delivery. Some of the large orders for other sections alluded to in former issues have not been placed, so far as is known. The market is somewhat irregular and our quotation of \$27.50 @ \$28 is continued, though particularly desirable orders could be placed at close to \$27, with the Western market relatively lower.

Financial.

The struggle over and the tumult of contending factions having subsided, the great disappointed minority will gracefully acquiesce in the decision of the popular voice. All alike will now contemplate the future with cheerful hopes, confident in the belief that a renewed career of prosperity awaits the country, in all its vast and varied interests. Recovery must quickly follow the period of partial paralysis, although the testimony from business sources is quite general that the interruption of the last few days has been much less serious than is usual during like periods of political agitation. Dun & Co.'s last circular says: "The single fact that bank exchanges outside of New York, in the last week of a Presidential campaign, exceeded those of last year by 10½ %, the clearings of last year having been exceptionally large, proves that the volume of legitimate business is unprecedented, for only a part of the increase can be attributed to speculative operations." A review of the statistics of bank clearings for October and the last ten months, as given by *Bradstreet's*, possesses much interest. The aggregate clearings at 32 cities

during October—those for which totals are available for four years—show a gain of about 10 % over October, 1887; about 6 % over October, 1886, and nearly 11 % over the corresponding month in 1885. The bank clearings outside of New York City have increased relatively more rapidly than at the metropolis. Leaving New York's totals out of those first given above, it is seen that the aggregate clearings for October, 1888, at 31 cities were \$1,776,035,290, or 15 % more than in October, 1887, 17 % in excess of the aggregate for that month in 1886, and 35 % larger than in 1885. It will be recalled that early in the year the clearings declined notably as compared with the preceding 12 months, and to this must be attributed the decreases in the 10 months' totals as compared with 1887. The aggregate at 32 cities is 5 % less than in 1887; at New York it is 8 % less.

The Stock Exchange markets have been uninteresting in the absence of any pronounced movement to affect prices, bulls and bears alike seeming to acquiesce in a policy of inaction until the political atmosphere cleared a little. Respecting the future opinions diverge, depending much on the settlement of the surplus question as affected by the election and upon crop movements. Attention was almost entirely absorbed by Reading and New York and New England—these two and Union Pacific furnishing about one-half of the entire week's business. All three closed lower than at the end of the previous week. The situation among the Southern roads continues to attract attention, and there is a very general impression that the Richmond Terminal antics are but the beginning of a grand consolidation of Southern roads east of the Mississippi. The trunk lines were strong throughout. The decline in Reading was attributed to the possibility of lower prices for coal. It was authoritatively stated that there is no truth in the story from Baltimore to the effect that the Richmond Terminal company is negotiating for the acquisition or control of the Baltimore and Ohio. Union Pacific defaulted on the interest on Denver, South Park and Pacific bonds and the bond market generally was a little lower.

Government bonds were steady. Quotations as follows:

U. S. 4½s, 1891, registered.....	107½
U. S. 4½s, 1891, coupon.....	108½
U. S. 4s, 1897, registered.....	127
U. S. 4s, 1897, coupon.....	127
U. S. currency 6s.....	122

The weekly bank statement shows a decrease of \$1,968,150 in surplus reserve, which now stands \$13,730,595, against \$9,786,550 at the corresponding time last year and \$5,632,750 in the first week of November, 1886. The decrease in reserve is larger than had been generally anticipated. In the currency movement receipts and shipments were about equally balanced, but there were free shipments South. In loans there was an expansion of \$704,500. Specie showed an unexpected decrease of \$2,397,600, and legal tenders increased \$242,900. Deposits decreased \$746,200. The November interest and dividend disbursements are estimated at about \$25,000,000. The railroads alone pay out nearly \$22,000,000, of which \$15,000,000 will be for interest on bonds. Money on call, owing to the demand caused by the monthly settlements, advanced in some cases to 4½ %. Time loans were offered in abundance at 3 to 3½ % for three months or less, and at 4 % for four to six months where first-class collateral was offered. Commercial paper was in fair supply and the demand continued good. Quotations, 60 to 90 days, 4½ % @ 5 %; first-class four months' commission house names 5 % @ 5½ %.

The posted rates for bankers' sterling are \$4.85 @ \$4.85½ for 60-day and \$4.88½ for sight. The market is strong. In Lon-

don money was easier. No further gold withdrawals from the Bank of England are announced as imminent. In consequence of uncertainty the directors have no choice but to maintain the present anomalous position.

Bond purchases by the Treasury Department during the week aggregated \$2,412,000. All were 4½s at 108½, and nearly all the offerings were at that figure. About \$3,000,000 4 % were offered during the week at prices ranging from 128 to 130, mainly at 128½, but none of them were accepted. Bond purchases up to date under the April circular aggregated \$92,159,850; and of this amount, in round numbers, \$51,750,000 were 4s and \$40,750,000 were 4½s.

The public debt statement shows that the reduction during the month of October was \$4,585,619.91. The total debt is now \$1,703,457,224.23, of which \$1,696,124,917.23 is principal and \$7,332,307 is interest. The decrease of debt since June 30, 1888, is \$28,294,620.57. The cash in the Treasury available for reduction of the debt is \$391,675,218. National bank depositories to-day hold \$54,480,279, or about \$3,000,000 less than on October 1. Government receipts during October were \$31,966,203, against \$31,803,172 in October, 1887. Receipts from all sources for the first four months of the fiscal year reach \$129,500,000, against \$134,131,569 for the first four months of the preceding fiscal year. The Treasury surplus is now about \$70,000,000, or \$40,000,000 below the highest point attained during the past year, and the money in circulation throughout the country is greater than at any previous time, partly as a consequence of the free silver coinage.

The wheat market has been much less excited, and spot stock is neglected. A curious feature was that on one or two entire days not a bushel was sold of spot stock. This has not happened before in many years. The demand for actual wheat is spoken of as no longer a factor, so that the absence of an export market has no appreciable influence. For the week there was a decline of 3¼ @ 4¢ a bushel on near futures. Breadstuffs, on account of this peculiar situation, are slow and hesitating. Cash corn toward the end of the week declined to the lowest point reached in some months. The total decline for the week was 8¢ @ 1¼¢ 7½¢ bushel on the near futures. Export business became very good when the lowest quotations were reached. The latter market is firmly held. The provision market is slow. The pork-packing season ended November 1, and returns from all points in the West indicate a total of about 5,070,000 hogs, against 5,610,000 last year. Sugar is without interest. Spot cotton is steady at full previous quotations. The report that the Farmers' Alliance of Georgia and Alabama had ordered its members not to sell between November 1 and 20 did not appear to have any effect on prices. Teas are steady and moderately active. Wool has a strong look. Ocean freights are decidedly firm, with increased inquiry for room to load corn. Coffee was depressed by large stocks at shipping ports and heavy receipts. In dry goods the order trade for spring maintains all the encouraging features previously noted. Values are steadily maintained. The railroads are carrying the largest tonnage in their history. The New York City Comptroller awarded \$1,500,000 of additional water stock to the Farmers' Loan and Trust Company, Mayor Hewitt remarking that the bids showed that the city of New York enjoys the highest credit of any corporate body in the world.

The imports of merchandise at this port during the week were valued at \$8,668,000, of which \$1,733,000 represents dry goods. Since January 1 the total is \$395,409,000.

against \$398,662,000 for the same time last year and \$369,534,000 in 1886.

According to official figures of the United States Department of Agriculture, the winter wheat crop this year is about 275,000,000 bushels, and spring wheat 183,000,000 bushels, making a total of 413,000,000 measured bushels.

Boston dispatches announce that W. D. Forbes, president of the Bank of Redemption, in that city, had resigned from his position and had made an assignment, the cause being unfortunate speculation in Atchison. The bank, it was said, loses nothing.

Metal Market.

Copper.—During the week under review London has improved with spot Chili Bars from £78 to £78. 5/, and with futures from £78. 10/ to £79. Good merchantable brands have followed suit and come £78. 5/, as against £78 a week ago. Best Selected has advanced to £83, sales 600 tons. The visible supply in England and France, as reported per cable, was, on the 1st inst., 91,740 tons, against 89,404 on October 1 and 48,500 tons on November 1, 1887. It is reported from Europe that Chili Bars are being transferred gradually from England to France, because in the latter country more liberal advances are made on them in store than in England. Absolutely nothing transpired in the open market in Copper during the week; the quotation is nominally 17½¢ for Lake Ingot and 16¢ @ 16½¢ for casting brands.

Tin.—The November 1 statistics are 11,913 tons visible supply in Europe and America, against 11,451 on October 1, and 12,966 tons on November 1, 1887, being tolerably good, London has advanced with spot Straits from £102 to 102. 2/6, and futures, £102. 10/ to £102. 12/6, sales, 550 tons. Here a listless state of affairs prevailed, 10 tons spot selling on the Exchange at 22.65¢, but it is held at the close at 23¢, 22.75¢ being bid for November and 22.65¢ for December. The October Tin shipments to the United States from the Straits Settlements sum up 750 tons, against 100 last year, and to England, 2000, against 2500; since January 1 they have been respectively 2900, against 4100, and 15,700, against 12,700, as per cable from Gilfillan, Wood & Co., Singapore, to Chas. Nordhaus, 89 Water street, New York, their agent.

Tin Plates.—Our market has been very quiet and nominally unchanged, with the exception of Coke Tins, which are 5¢ 3/4 ton lower. There are a good many inquiries being put out for forward delivery, and, as makers' views are somewhat lower, no doubt business will result, now that the tariff question may be deemed settled. We quote at the close, large lines, ordinary brands, 3/4 box: Siemens-Martin Steel, Charcoal Finish, \$5 @ \$5.75; Coke Finish, \$4.70; Terns, \$4.20 @ \$4.35; Bessemer Cokes, \$4.40 @ \$4.45; and Wasters, \$4.25. Cokes are 13/3 @ 13/6 at Liverpool.

Lead.—The market has been comparatively quiet and featureless. Consumers have been picking up a little Lead in the open market to the extent of 500 tons at 3.70¢ @ 3.75¢, and on the Exchange 750 tons have changed hands at similar rates, the closing rate in the open market being 3.67½¢ @ 3.75¢, at which there is a steady feeling, sales of spot Lead having been made at 3.67½¢. The London market is £13. 12/6 Soft Spanish, and £13. 17/6 English Pig. At St. Louis there has been firmness at 3.60¢ @ 3.62½¢ Common, and 3.65¢, Corroding.

Spelter.—Remains in good position at 5½¢, Common Domestic, the lowest at which it can be had. Silesian is quoted £18. 17/6 in London, and here 6¢.

Antimony.—A fair demand has prevailed at 10½¢ @ 10¾¢, Hallett, advanced to £63 in London, and 12½¢ @ 13¢, Cookson.

New York Metal Exchange.

The following sales are reported:

THURSDAY, November 1.	
200 tons Lead, cash.....	3.72½¢
228 tons Lead, November.....	3.82½¢
16 tons Lead, November.....	3.80¢
SATURDAY, November 3.	
16 tons Lead, December.....	3.67½¢
MONDAY, November 5.	
10 tons Tin, spot.....	22.65¢
WEDNESDAY, November 7.	
170 tons Lead, spot.....	3.67½¢
50 tons Lead (in transit).....	3.67½¢

Coal Market.

The Anthracite Coal market is very dull, with all descriptions in excess, Stove excepted, and no improvement is looked for while the present mild temperature continues. The first sign of weakness was in the Steam sizes, such as Broken, Steamboat and Pea, and with the closing of furnaces in Pennsylvania, on the line of the Reading particularly, the depression from this source became more noticeable. The sales agents in this city at their last meeting made no change. Bituminous Coal is in good demand and the scarcity of cars is still a subject of complaint. Prices are more or less affected by competition in supplying the market, so that while pool prices are recognized as a basis, and are sometimes insisted upon, sales of inferior grades are made as low as \$2.90. The interior demand can hardly be maintained beyond another fortnight in prospect of interrupted navigation. The statistics of Anthracite production for the last week are not at hand, but it is surmised that the aggregate is not more than 750,000, owing to shortened time in the Lackawanna region, as compared with 886,000 during the previous week.

Freights from New York eastward are quoted at 50¢ to New Haven, \$1.10 to Boston and \$1.15 to Portland, free of discharging. The average price of Coal in October at the Schuylkill collieries, drawn to determine wages, was \$2.61; last year it was \$2.62. The trade is grieved to hear of the serious illness of Fred. A. Potts. On Wednesday morning he was more comfortable. Pittsburgh is to have another outlet to Lake Erie by way of the Pittsburgh and Western Railroad to Butler, and from that point by an intermediate link connecting with the Nickel Plate road. The new line will be an important competitor of other Pittsburgh lines to the lakes in the Coal, Coke and Iron industries. The road will connect with the Lake Shore at Amasa.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from October 19 to November 1, inclusive, and from January 1 to November 1, inclusive, were as follows:

	Oct. 19 to Nov. 1, Tons.	Jan. 1 to Nov. 1, Tons.
Iron Ore: A. Earnshaw.....	348	6,687
Pig Iron: Crocker Bros.....	800	10,997
Naylor & Co.....	750	7,245
G. W. Stetson & Co.....	500	13,550
G. T. Carter.....	130	130
Muller, Schall & Co.....	100	100
N. S. Bartlett.....	100	4,800
James Williamson & Co.....	100	5,000
Spiegel Eisen: Naylor & Co.....	1,499	11,132
J. A. Jansen.....	840	11,392
Crocker Bros.....	835	10,680
Dana & Co.....	465	3,953
Gelsenheimer & Co.....	10	260
Steel: Oelrichs & Co.....	182	380
W. F. Wagner.....	55	1,265
R. H. Wolff & Co.....	49	563

Kunhardt & Co.....	33	33
J. Abbott & Co.....	300	499
M. Cohn.....	12	220
Thos. Prosser & Son.....	30	88
M. Strouse & Co.....	22	52
Montgomery & Co.....	19	87
C. F. Boker.....	18	211½
Chas. Hugill.....	15	264½
Pierson & Co.....	14	134
Newton & Shipman.....	13	142
R. F. Downing & Co.....	12	212½
F. S. Pidditch.....	11	475
A. Milne & Co.....	69	1,175
C. W. Power.....	4	56
Temple & Lockwood.....	2	11
Steel Rods: Naylor & Co.....	198	17,116
Dana & Co.....	528	5,061
R. H. Wolff & Co.....	207	3,531
A. Heyn.....	101	1,512
G. A. Galpin.....	50	2,870
J. Abbott & Co.....	50	3,800
Hondollette & D.....	30	30
Cary & Moen.....	22	781
Pierson & Co.....	20	41
J. A. Roebbing's Sons.....	15	1,495
Steel Blooms: Naylor & Co.....	1,632	3,798
Steel Bloom Ends: Dana & Co.....	191	1,319
G. T. Carter.....	160	661
Steel Sheets: Pierson & Co.....	32	972
Lalance & G. Mfg. Company.....	27	484
Williams & Whitney.....	10	39
Steel Billets: Naylor & Co.....	202	1,947
A. Milne & Co.....	76	915
Steel Billet Ends: Dana & Co.....	124	124
Steel Wire Rods: Dana & Co.....	233	233
Naylor & Co.....	614	614
Cary & Moen.....	50	63
Steel Strips: M. Strauss.....	20	20
Steel Wire: J. A. Roebbing's Sons.....	57	248
Steel Hoops: A. R. Whitney & Co.....	136	2,390
Naylor & Co.....	25	25
Steel Boiler Plates: Post, Martin & Co.....	15	15
Steel Barrel Hoops: A. R. Whitney & Co.....	224	224
Iron: J. Abbott & Co.....	52	6,873½
Iron Rods: Naylor & Co.....	101	646
J. Abbott & Co.....	50	242
Iron Girders: R. F. Downing & Co.....	1½	502½
Iron Wire Rods: J. Abbott & Co.....	201	201
R. H. Wolff & Co.....	50	110
Charcoal Iron: Page, Newell & Co.....	20	348
Scrap Iron: A. Abbott.....	206	206
Swedish Bar Iron: C. v. Philp.....	120	398
Swedish Rough Bars: C. v. Philp.....	120	265
Cotton Ties: Bullard & W.....	75	1,720

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	53,638	504,801
Dickerson, Van Dusen & Co.....	18,285	248,291
A. A. Thomsen & Co.....	11,932	128,410
Pratt Mfg. Co.....	9,092	151,806
T. B. Coddington & Co.....	6,050	146,535
Brace & Cook.....	5,659	88,250
N. L. Cort & Co.....	4,840	96,878
Wolff & Roesing.....	3,448	84,958
Central Stamping Company.....	3,371	32,127
R. Crooks & Co.....	3,280	61,674
G. B. Morewood & Co.....	2,607	43,288
Hy. Whittemore & Co.....	1,614	46,293
Lombard, Ayres & Co.....	1,272	13,115
E. S. Wheeler & Co.....	1,062	7,871
Merchant & Co.....	912	20,210
H. R. Demilt & Co.....	653	17,202
Jas. Byrne & Son.....	500	33,354
Lalance & G. Mfg. Co.....	328	4,743
S. Shepard & Co.....	225	18,758
C. S. Mersick & Co.....	144	6,290

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	449,282	9,950,901
Phelps, Dodge & Co.....	392,772	2,180,557
Naylor & Co.....	348,654	2,882,022
Jas. E. Pope, Jr.....	67,253	394,104
American Metal Co.....	55,921	2,708,376
D. Thomsen & Co.....	22,906	249,363
Knauth, Nachod & Kuhne.....	22,324	96,636
A. A. Thomsen & Co.....	22,282	166,729
R. Crooks & Co.....	22,000	766,516
Lehman, Sons & Co.....	14,024	102,054
Lead: American Metal Co.....	22,148	44,236
Spelter: American Metal Co.....	55,305	609,054
Sheet Zinc: H. Lamarche's Sons.....	3,881	8,212
Antimony: Phelps, Dodge & Co.....	50	600

Irons and Metals Warehoused from October 19 to November 1, inclusive:

	Tons.
Scrap Iron: E. P. Spaulding & Co.....	495
Lead: Schultze & Rueckhaber.....	883,937

Hardware, Machinery, &c.

Backus, O. S., Iron Castings, 17	
Barbour Bros. & Co., Mach'y, pkgs., 7	
Bernard, Geo. B., Ironwork, pkgs., 50	
Boker, Hermann & Co., Mdse., cs., 4; Iron Chains, cks., 28	
Boker, Carl F., Mdse., cs., 21	
Clark Thread Company, Mach'y, pkgs., 35	
Field, Alfred & Co., Mdse., cs., 46	
Graef Cutlery Company, Cutlery, cs., 5	
Meacham Arms Company, Mdse., cs., 50	
Merch. Desp. Company, Mach'y, pkgs., 23	
Pierson, H. L., Ironwork, pkgs., 273	
Schoverling, Daly & Gales, Mdse., cs., 4	
Wichbusch & Hilger, Lim., Mdse., cs., 6; Iron Chains, 29	
Order, Mach'y, pkgs., 4	

Exports of Metals.

	Oct. 19. to Nov. 1. Pounds.	Jan. 1 to Nov. 1 Pounds.
Copper: J. Abbott & Co.....		11,304,650
Lewisohn Bros.....	68,750	3,997,772
F. A. Lomal.....		2,581,263
American Metal Company..	172,000	5,906,862
G. H. Nichols.....		225,939
J. Bruce Ismay.....		112,000
S. Mendel.....		560,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Com- pany.....		224,034
J. Kennedy, Tod & Co.....		112,026
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company		449,881
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co....		1,451,130
Williams & Terhune.....	99,320	99,320
J. Parsons & Co.....		420,000
Naylor & Co.....		448,809
Bridgeport Copper Com- pany.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,984
Ladenburg, Thalmann & Co.		229,371
W. H. Crossman & Bro.....		4,000
R. Crooks & Co.....		1,000
Copper Matte: Williams & Terhune.....	975,726	36,323,744
Lewisohn Bros.....		3,021,610
American Metal Company..	824,938	4,080,604
J. Abbott & Co.....	42,447	337,447
C. Ledoux & Co.....		969,801
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
Kunhardt & Co.....		180,495
Spelter: Freidensville Zinc Company.....	56,000	56,000
Old Copper: Burgess & Co....	28,704	629,337

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Nov. 7, 1888.

There has been a large business *sub rosa* in Copper and Copper furnace material, and the actual transfers the past week or ten days are in marked contrast with the transactions as reflected by the ordinary speculative trading. The purchases have been largely by the "syndicate" agents, and suggest that, while meeting the demand for Chili Bar futures freely at £78. 10/, they are ready buyers of either prompts or futures at 10/ less. One firm is reported to have sold the "syndicate" a block of 200 tons at £78, deliveries running the next two months. Among sales of Anaconda Matte the past fortnight Messrs. James Lewis & Sons' circular notes 150 tons at 15/6, at Liverpool.

Several new copper companies have been floated the past 30 days, and their shares nearly all subscribed for.

In the face of the steadily downward course of prices the greater portion of the week, prominent operators in Block Tin are prophesying a higher market for the future. Their belief is based upon the merits of the statistical position. However, the demand from other than American buyers is somewhat disappointing. It is stated that the principal buyer for the American market took 1300 tons from the London stock last month.

Pig Iron "warrant" speculation has been dormant. Inside brokers who were conspicuous in the efforts made recently to advance prices have since figured more prominently in operations of the reverse character. There is, however, a tendency to proceed with caution in view of the several influences that might be brought to bear with unfavorable effect in the event of either excessive buying or overselling. Makers' brands of Scotch Pig have ruled irregular, some showing a slight advance and others a decline. Hematites are lower, but Cleveland Pig remains steady.

There has been no change of importance in the Tin-Plate market. Makers still offer very moderately for prompt delivery in view of the extent to which they have orders booked ahead; but new orders are running very light, and those from America are disappointing. What little business has been done indicates a slight margin of difference between the actual trading basis and the prices generally quoted. The works of the Villiers Tin-Plate Company, Limited (two mills), have been started up.

In the Steel trade there has been no material change. A good business is doing in shipbuilding and railway descriptions and in Billets but at somewhat variable prices, while Blooms, Slabs and Rods are in only moderate request. Manufactured Iron continues to meet with brisk sales and prices are strong, with a further 2/6 advance on Common Bars. Old Material is in only moderate request, but the offers made find holders firmer on prices and less anxious to sell.

Scotch Pig.—The market has been very quiet and prices show some irregularity:

No. 1 Coltness, f.o.b. Glasgow.....	49/
No. 1 Summerlee, " ".....	50/
No. 1 Gartsherrie, " ".....	47/
No. 1 Langloan, " ".....	48/6
No. 1 Carnbroe, " ".....	43/6
No. 1 Shotts, " at Leith.....	48/6
No. 1 Glengarnock, " Ardrossan.....	47/6
No. 1 Dalmellington, " ".....	42/6
No. 1 Eglinton, " ".....	41/6

Steamer freights, Glasgow to New York, 6/6

Liverpool to New York, 10/.

Cleveland Pig.—Business moderate, but no change in prices. No. 1 Middleboro', G.M.B., 37/; No. 3 do., 34/6.

Bessemer Pig.—Transactions have been on a smaller scale and prices are weaker. West Coast brands, mixed numbers, 42/6, f.o.b. shipping point.

Spiegeleisen.—The demand for Spiegel keeps up well and prices are firm. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—The market continues active, and prices, while irregular, are firm. Standard English sections quoted at £3. 18/9, f.o.b. at N. W. England shipping point.

Steel Blooms.—No improvement in the demand for these, and prices unchanged. We quote £3. 18/9 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—There is still a fairly active business and prices are held firmly. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—A moderate business passing at about former prices. Bessemer, £3. 18/9, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Makers very firm on prices and report a good demand. Mild Steel No. 6 quoted at £6 and No. 5 at £5. 19/3, f.o.b. at N. W. England shipping point.

Scrap Iron.—The market slow and prices irregular. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Old Rails.—Business moderate, but sellers firmer on prices. Tees quoted at £3. 2/6, and Double Heads £3. 5/ @ £3. 6/3, c.i.f. New York.

Crop Ends.—A fair business at steady prices. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—Slightly lower prices on prompt deliveries and no improvement in

volume of sales. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/ @ 15/6
IC Bessemer steel, Coke finish.....	14/ @ 14/3
IC Siemens " ".....	14/ @ 14/3
IC Coke, B. V. grade.....	13/6 @ 13/9
Charcoal Terne, Dean grade.....	12/ @ 12/6

Manufactured Iron.—Demand continues brisk and the market strong. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars.	£ s. d. 8 2 6
Common " " " " " " " " " " " "	@ 5 10 0
Staff. Bl'k Sheet, singles.....	@ 7 10 0
Welsh Bars (f.o.b. Wales).....	4 17 6 @ 5 0 0

Tin.—A fair business at irregular prices. Straits quoted at £102 @ £102. 5/, spot, and £102. 10/ @ £102. 15/ for three months' futures.

Copper.—The market firm, but rather quiet. Chili Bars, £78. 7/6, spot, and £79, three months' futures. Best Selected, £82 @ £83.

Lead.—Dealings have been large and the market shows more firmness. Soft Spanish, £13. 15/.

Spelter.—A fairly active business at steady prices. Silesian, ordinary, £18. 15/.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	40.2
Florin (Austria).....	35.9
Milreis (Portugal).....	\$1.08
Milreis (Brazil).....	23.8
Mark (Germany).....	Pounds. 2.205
Kilogram.....	Picul..... 134.

BRAZIL.

PARA, October 30, 1888.—**India Rubber.**—Shipments from Para to the United States for the months of August, September and October are 600 tons less than for the same time last year, the falling off being due to an increased demand for Europe. The stock remaining on hand is a mere trifle, and so is the amount afloat for New York.—*Per cable direct.*

EAST INDIES.

SINGAPORE, September 19, 1888.—**Tin.**—Our last report was dated 5th inst., since when a large business has been done at up to \$39.25 ¾ picul, and the market closes firm at \$38, with buyers, but no sellers. Shipments for the remainder of the year are expected to average at least 2000 tons per month. During the first eight months there have been shipped from the Straits Settlements to the United States 22,289 piculs, as compared with 59,481 last year, 52,817 in 1886, 20,252 in 1885, 41,857 in 1884, and 78,739 in 1883. **Gum Copal.**—There are some signs of a revival in the demand, and we have to report sales of upward of 4600 piculs, mostly for the United States. Prices have ranged from \$4 to \$11, according to quality. **Gum Damar.**—Some sales of Palembang have been made at \$20.25 @ \$21.50. **Tonnage.**—London rates via canal have advanced owing to scarcity of tonnage, to 35/ for weight. New York via Cape, the Sontag and W. Gildemeister are loading; cargo is very scarce, and rates are a shade easier. For Boston the John M. Clerk is loading. **Exchange** is firm at 3/2½ for six months' sight credits.—*Gilfillan, Wood & Co.*

MANILA, October 20, 1888.—**Hemp.**—Has been steady at \$11.12½ ¾ picul, against \$9.50 same date last year, equaling per ton cost and freight, £38. 7/6, against £33. 17/6. Clearances for the United States since last cable amount to 12,000 bales, against none last year; since January 1 they reach 184,000, against 190,000 bales; there remain loading for ditto 42,000, against 56,000; clearances for England since January 1, 284,000 bales, against 184,000; loading for ditto, 1000, against 5000; cleared for other countries, 61,000, against 34,000; receipts at all ports since last cable, 17,000, against 12,000; since January 1, 532,000 bales, against 443,000 in 1887, and 337,000 in 1886. **Freight**, \$7, against \$5.50. **Exchange**, six months' sight on London, 3/7, against 3/8½.—*Ker & Co. to Mr. Charles Nordhaus, their agent, 89 Water street, New York, per cable direct.*

SPAIN.

BILBAO, October 20, 1888.—**Iron Ore.**—A good deal of business has been done during the week, not only on the spot for single cargoes, but considerable amounts have been bought

for forward delivery next year extending over nine months in succession, at 8/ @ 8/4 for Campinil, and 7/ @ 7/6 for Rubios. These are the figures current to-day, but they may have been slightly different at private sale. The number of steamers in port is still quite reduced, hence the amount of Ore shipped is not as heavy as last year, not exceeding since January 1 3,019,759 tons, as compared with 3,546,227 during the corresponding period in 1887. *Pig Iron*.—Shipments to Hamburg have been made to the extent of 1480 tons, and 235 tons coastwise.—*Bilbao Marítimo y Comercial*.

GERMANY.

HAMBURG, October 27, 1888.—*Iron*.—The Rhenish-Westphalian Pig Iron market has, on the whole, been getting livelier. The demand for Steel material from abroad has resulted in larger orders; should this movement continue a little longer, it cannot fail to have a favorable influence on Pig Iron of all sorts. The feeling in Spiegel is improving; more is asked for it. Siegen makers have raised the price for Forge Pig to 48; there are orders for delivery next year. Thomas is in brisk request at 44. Bessemer, on the other hand, is dull at 52 @ 53. Foundry Pig is taken steadily at 53 @ 56. English Bessemer cannot be had for less than 44/6 on the West Coast. White Luxembourg Pig is worth 37.50; Gray, 43. Finished Iron is selling well for domestic use; the reverse is the case for export. At ruling high prices for Pig, Finished cannot be made cheap enough for export. Hoop Iron remains steady at 127.50. Plates and Sheets of all sorts continue doing well. The drawn Wire syndicate is to terminate on November 28; efforts will be made to continue it on a modified basis, pending which the Wire branch is unsettled. Wire Nails have of late been selling easily enough, but at depressed, unremunerative figures. Both foundries and machine shops are, if possible, still busier than before; this applies quite as much to car works. *Metals*.—Lead is drooping, Copper weaker, Spelter sustained.—*Bor-senhalle*.

The Paris Exhibition.—Preparations for the Paris Exposition of 1889 are on a colossal scale. The Eiffel Tower has reached an altitude of about 500 feet, or one-half of the total elevation. To the right and left rise two gigantic and graceful domes, and beyond, interspersed with kiosks and fountains, are seen the lofty roof and domed portico of the great central exposition hall. Between the central building, with its two enormous wings, are fast rising a number of minor structures, destined to receive the products of favored industries. Then all along the Quai d'Orsay and the river front, down to the esplanade of the Invalides, are series of long galleries for the reception of agricultural produce and machinery. On each side of the Pont de Jena, and fronting the Trocadero, they are constructing groups of buildings representing the habitation of man in every country, among all races, and at every stage of civilization, furnished as near to the historical reality as possible. The Trocadero itself, with its central buildings, its vast semicircular galleries and colonnades, its cascades and grounds, is to serve for a horticultural exhibition. In the left wing are exposed casts of all the masterpieces of ancient, mediæval and modern sculpture, together with casts and photographs of all the most renowned building of the East and West. The ethnological museum and the objects secured from New Mexico, Colorado and other Western regions are especially attractive.

A tunnel, over a mile long, and cut through solid rock, at a cost of \$1,000,000, has just been completed on the Montana Central railroad.

Burton H. Cook, 140 Quincy street, Brooklyn, N. Y., exhibits, at the American Institute Fair, Cook's Rotary Ash Sifter and Coal Screen. The device is shown in Mr. Cook's exhibit, which stands at the north side of the main hall. The circulars state that the Cook's sifter took the first medal ever awarded by the American Institute, and in 1887 was given the medal of superiority.

Hardware.

During the past week business has been exceptionally quiet and there is little new to be reported, but it is expected that with the subsidence of engrossing attention to politics there will be a return of trade to its former regular and satisfactory condition. Prices in most lines are unaltered.

Cut Nails.

Very little has occurred during the week to change the tone of the market. Cut Nails remaining \$1.80 to \$1.90 from dock for carload lots, and \$1.90 to \$2 from store. The refusal of a Chicago concern to enter into any arrangement has caused the proposed Western Nail Association to be given up for the present.

Barb Wire.

The market remains unchanged, prices continuing as before, with only a moderate demand. Quotations in this city are as follows: Galvanized Four-Point, 3.55 to 3.6 cents, with concessions for large lots.

Wire Nails.

The market remains unchanged since our last report, prices being regularly maintained by the manufacturers, whose business is, however, limited on account of the frequent offerings by parties who purchased largely at the lately ruling low prices, from whom the goods may be purchased at from 5 to 10 cents per keg below the extreme price at which the associated manufacturers are at liberty to sell. The regular quotations remain as before: \$2.65 for small lots, and \$2.55 for carloads. Wire Nails in papers are not as firm as the Standard Nails, owing especially to the fact that they are made by several outside parties, and there is no difficulty in obtaining the goods at slight concessions beyond the regular prices.

Miscellaneous Prices.

A very large business is done in Mica in Chicago, and, until quite recently, prices have been very steady, and results have been satisfactory to both the dealers and the producers whom they represent. A reasonable profit was obtained, which was fairly remunerative to all parties, and, at the same time, repressed speculation. Now, however, the trade is demoralized, values ruling below the actual cost of production, according to statements made by those in a position to ascertain the facts. One large dealer claims that some of his competitors have lowered prices fully 25 per cent. The reduction was not caused by a sudden increase in the supply, but by injudicious salesmen who were unduly influenced by buyers. It will take some time for the Chicago Mica market to recover from the effects of this ill-advised action. It is another illustration of the evils of giving salesmen discretionary power to name prices.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., have added a new and important department to their business, as they are making a specialty of Fire and Burglar-Proof Safes. These goods, which are illustrated in a separate catalogue, are offered to the trade at special prices as follows, terms 60 days, or 2 per cent. discount for cash in 10 days:

No. 2 Safe.....	\$17.50
No. 3 Safe.....	25.00
No. 4 Safe.....	35.00
No. 5 Safe.....	55.00
No. 6 Safe, with usual hinges.....	65.00
No. 6 Safe, with double crane hinge.....	70.00

Henry's Patent Combination Haft, manufactured by Joshua Britton & Son, Stoughton, Mass., and shown in their advertisement on page 55, is sold at \$6.50 per dozen.

We are advised that P. Lowentraut, Newark, N. J., for whom James Forsyth is agent, 116 Chambers street, New York, has as many orders for Skates as he will be able to fill by December 1, and in order that his customers may not be disappointed desires it to be noted that he is not in a position to fill other orders until that date. He also announces an advance of 20 cents on No. 1 and No. 8 Skates, and 25 cents on all other numbers.

The following revised prices, under date November 1, have been announced for Lead Pipe, Sheet Lead, Block Tin Pipe and Tin Lined Pipe:

Lead Pipe, per pound.....	6½ cents.
Block Tin Pipe, per pound.....	45 cents.
Sheet Lead, per pound.....	7¼ cents.
Tin Lined Pipe.....	15 cents.

McIntosh, Huntington & Co., Cleveland, Ohio, announce special prices on Slaw Cutters and Cimeter Hay Knives.

The prices of Wrought-Iron Pipe are firmly maintained at the last advance and the quotations named by the different manufacturers are substantially the same, an understanding in regard to prices having been again reached.

The ruling prices of Tacks show a considerable divergence in the quotations of different manufacturers, and some lower prices than have heretofore prevailed are now ruling.

The following revised prices for Shot were announced by the manufacturers November 1. They are subject to the usual discount of 2 cents for cash in five days:

Drop, per 25-pound bag.....	\$1.35
Drop, per 5-pound bag.....	.32
Buck and Chilled, per 25-pound bag.....	1.60
Buck and Chilled, per 5-pound bag.....	.37

Foster Bros., Fulton, N. Y., in their catalogue represent their line of Cleavers, Butcher Knives, &c., giving illustrations of the goods, their price list being furnished in a separate sheet. Their announcement in regard to this line of goods will be observed on page 59, in which some of their patterns are represented. Their Knives are subject to a discount of 40 per cent., and their Cleavers to a discount of 30 per cent.

Ammunition.

As the result of conferences between the special houses and the Ammunition Association some important changes have been made in the system by which the association markets its goods and regulates prices. The E. C. Meacham Arms Company, St. Louis, has been reinstated as a Special House. This action was taken so that the market might be free from the serious disturbance that would result from the continued opposition of the company and their offering goods at irregular prices. It was ultimately approved by the other specials, by whom the modifications made in the system of the association were also accepted. These changes are made with a view to correcting the irregularities which had developed and also making the arrangement more satisfactory and permanent. No change has been made in the prices of the goods or in the terms at which they are obtained by contract or non-contract houses, but a modification of the arrangements with the special houses has been decided upon. In the new plan, the main features of which are settled, though some minor details are still undecided, the special houses will receive from the association a fixed sum in lieu of the commission heretofore given them on goods sold by them to the contract houses, thus removing, it will be seen, some incentive for seeking as large a proportion of the business of the A houses as they have recently been obtaining. The one-third clause, to which strenuous objection has

repeatedly been made, has been recorded, and also the requirement that the reports of the special houses be attested by affidavit. It is hoped that the new measures thus adopted will have the effect of putting the Ammunition business in better shape than it has been for some time. Precisely what effect the new method of remunerating the special houses as distributors of the goods may have remains to be seen, but it will probably lead them to seek more than heretofore the orders of non-contract houses, on which they are given a commission or rebate, and at the same time it removes the inducement to special efforts to sell the contract houses, as for such business they are paid a fixed sum, without reference to the amount of their sales. The fact that the E. C. Meacham Arms Company have been restored to their former place as a special house, and are understood to be heartily in accord with the new system, is an important feature in the situation.

Trade Topics.

At the last meeting of the Heavy Hardware Jobbers' National Union, held in St. Louis, on the 19th ult., the following resolution was offered and unanimously approved:

Whereas, The present tendency in trade and traffic is developing into combinations and trusts, the very spirit of which savors of centralization of capital and power, which of itself is directly opposed to the genius of our national institutions. This association favors the broadest freedom and independence, in both buying and selling, and it is not the purpose of this association to combine on prices in either buying or selling; therefore, be it

Resolved, That no combination or selling prices are intended by this association, but that we associate for mutual protection with each other in trade, and while not establishing prices which will bind any locality, or individual member, each member of this association pledges himself to each other to sell his goods, of all classes, at prices which will yield a reasonable net profit, and that we each recognize the fact that legitimate trade requires this and no more to preserve individual freedom of action, while at the same time mutual cooperation as members of an association.

The unbusiness-like habit which is sometimes practiced of failing to prepay telegrams when desiring information from merchants and manufacturers in regard to goods which they offer, is referred to in the following letter:

I wish to all your attention to the fact that some business men send all their telegraphic dispatches collect. It is a nuisance. Some persons, I suppose, think that because a man favors another with his trade that he is at perfect liberty to wring out of him all the expense of wiring, whereas such expenses between the two parties that are dealing with each other ought to be mutual—that is, each party prepay his own dispatches. Of course, I do not mean that answers ought to be prepaid where such answers do not involve or anticipate any prospective business between the two, but where two merchants or a merchant and manufacturer are dealing together, each ought to prepay his own dispatches. Some three months ago a merchant commenced wiring me collect, negotiating for a carload of goods, and before I could stop him it cost me \$9.50 and I did not sell him after all.

A recent issue of the *Graphic* of this city is devoted largely to Louisville, Ky., with illustrations representing some of the principal business establishments, and articles relating to the city, its manufactures, business, &c. Among these il-

lustrations are some of the Hardware house of W. B. Belknap & Co., the front of their store being shown and a view of their sample room given. In the article relating to the house, their prominent position among Hardware jobbers of the Middle and Southern States is alluded to, and a reference made to the various departments of their business. As referring to the position which jobbing houses occupy in the Hardware trade, the following extract from the article may be of interest:

Among the best evidences of Louisville's growth, prosperity and expanding trade is the development of a better class of jobbing houses. Manufacturers have multiplied surely, and are increasing in variety and magnitude, but concurrent with this go the jobbers or the great distributors of goods, quite as essential in the second place as are those who manufacture in the first. Large stocks of goods in the hands of wholesale houses tide over times of suspension of manufacturing and afford a supply to the consumer when it could not be otherwise had. In short, jobbing houses are the grand reservoirs of over supply in times of excessive production and main sources of distribution when the supply runs short of the country's needs, exerting thus a conservative force of inestimable value. So much for generalities.

Items.

Simmons Hardware Company, St. Paul, Mo., have issued their fall catalogue. It is devoted to Skates, Sleds, Sleigh Bells, Boys' Wagons and Wheelbarrows, Fire Goods, Ice Tools and Lumbering Tools. The Ice Tools which are tastefully exhibited on page 30 are those manufactured by Wm. T. Wood & Co., for whom the house are Western agents. A complete line of the goods is carried in stock. The company have also recently taken the agency for the Champion Lumbering Tools, some of the leading patterns being illustrated. It is stated that special catalogues of the Ice Tools and the Lumbering Tools will be sent to those who desire them. As evidence of the enterprise of the house and the completeness of their establishment it is to be noted that the catalogue has been printed by them in their own printing department.

Kingman & Co., Peoria, Ill., and St. Louis, Mo., issue a handsome catalogue of more than 200 pages, in which they illustrate their extensive line of Farm Machinery, Wagons, &c. It opens with a list of their principal agencies, including the Moline Plow Company, Moline, Ill.; Standard Mfg. Company, Dayton, Ohio; Marseilles Mfg. Company, Marseilles, Ill.; Vandiver Corn-Planter Company, Quincy, Ill.; Russell & Co., Massillon, Ohio; Milburn Wagon Company, Toledo, Ohio, and Fish Bros. Wagon Company, Racine, Wis. They have also a warehouse in Kansas City, Mo.

Palmer Hardware Mfg. Co., Troy, N. Y., issue circulars of King's Patent Adjustable Bit Gauge and King's Improved Sash Support and Bolt, which they are putting on the market.

McIntosh, Huntington & Co., Cleveland, Ohio, issue a number of new pages for their catalogue. They relate to Locks, Vises, Registers and Door Springs.

Edward Kirby & Co., commission merchants, Alexandria, Egypt, have added to their business a tourists' office, and they are making arrangements to convey travelers up the Nile, also to Palestine, Constantinople and other points.

John Pritzlaff Hardware Company, Milwaukee, Wis., have issued a price current devoted to Axes, Cross-Cut and Wood Saws,

Lumbering Tools, Hay Knives, Stove Boards, Meat Cutters, Skates, Sleigh Bells and other seasonable goods.

The death of Phineas S. Hadger, secretary of the E. D. Clapp Mfg. Company, Auburn, N. Y., occurred on the 25th ult. The funeral was attended Monday, 29th ult., from his late residence in that city.

The Yale & Towne Mfg. Company have most handsomely fitted up their new Chicago office and salesroom at 152 and 154 Wabash avenue. The room is very wide and deep, giving them most spacious quarters, and affording ample opportunity for a tasteful arrangement of their several departments, as well as a very striking display of their goods. The cabinets have not yet been completely furnished with the samples which are to occupy and adorn them, but enough has been done in this line to enable the visitor to form some conception of the artistic possibilities in a display of Builders' Hardware. It is expected that the stock will be completely arranged at an early day, when a more detailed description of this establishment will be given. The company propose to make it one of the finest salesrooms for Builders' Hardware in America.

The Lissberger Metal Company have established an office and salesroom at 21 West Lake street, Chicago. They are manufacturers of Plumbers' and Tinnerns' Solder, and of Stereotype, Electrotype and Babbitt Metals; also smelters, refiners and dealers in Ingot Copper, Pig Lead, Pig Tin, Antimony, &c. Their works are in New York. The Chicago representatives of the company are M. J. & J. D. Lissberger.

Chase & Churchill, an old and well-known firm of high standing, at Weeping Water, Neb., have sold their Hardware business to Sackett & Amerman. The purchasers are old residents of that place, and are understood to have abundant means to carry on the business. Chase & Churchill will continue in the Crockery trade, having hitherto been interested in both Crockery and Hardware.

In the item relating to the manufactures of the F. B. Harkins Foundry Company, Bristol, Pa., in our issue October 25, the address was incorrectly given as Bristol, Conn. The trade will please to note the correction, as it may have led some of them to address letters erroneously.

G. & H. Barnett, Black Diamond File Works, Philadelphia, have been awarded a silver medal for the best Files and Rasps by the Centennial Exposition of the Ohio Valley and Central States at Cincinnati.

Tendencies in Trade.

The following letter, from a Missouri Hardware house, while referring to the increase of direct dealings between the merchant and manufacturer, alludes to the important place filled by the jobbers as distributors of goods:

In our opinion there are more goods sold direct from the manufacturers to the retailers than there were one or five years ago, and there seems to be a general tendency in that direction; but we think it will never become universal, as, in one sense, the jobber is as necessary to the trade as the manufacturer or retailer. There are several reasons on which we base our opinion, one or two of which we give, as follows: Retailers are getting educated to the idea that it is better to order often and in smaller quantities, which does not require as much capital in their business as it would to purchase in jobbing quantities in order to obtain the extra discount given by the manufacturers. Another point in favor of the jobber is that they carry in stock a variety of goods usually sold in the retail Hardware busi-

ness, which could not all, nor 10 per cent. of them, be furnished by the general manufacturers of the country, thus making it necessary for the retailer to send out ten orders in order to obtain what he can get through the jobber in one. Not only that; from the jobber he always has such a variety to select from that he can make out an order large enough to make up a freight order, which, for profit, should never be less than 100 pounds shipping weight, as the railway companies charge as much for 10 or 50 pounds as they do for 100 pounds, and then the goods in the hands of the jobbers are at points nearer to the retailer, which assures him less freight and greater promptness in receiving his goods, and the small per cent. taken by the jobber is but just compensation for the convenience and advantage the retailer and consumer derive from receiving their goods in small quantities and the time saved in obtaining them.

From a gentleman who has exceptional opportunities for observing the tendencies of trade we have the following, in which it will be seen that the opinion is expressed that jobbers are more than holding their own:

It was my impression six months ago that the jobbers were losing their grip on the large trade, which was going to manufacturers. But my opinion now is that the large retailers do not care to pay a premium for the privilege of buying goods of manufacturers, and they seek to buy in the cheapest market and the large jobbers are doing more business than ever in their history, and I see no reason why they will not continue to have the same experience right along. It is an advantage to a buyer to place his orders with a jobber for many reasons, among which may be mentioned that they are filled quicker and he can order many lines of goods from the same concern, while in buying from factory he is often compelled to buy more than his trade demands to make an order of sufficient volume to justify separate shipment. Jobbing houses are extending their lines constantly to meet the wants of the trade.

The letter printed below from Minnesota compares the experience of our correspondents with that of F. B. Straub & Co. as represented in their table recently published:

We were particularly interested in the table as prepared by Fred. P. Straub & Co. in *The Iron Age*, October 11. It shows a systematization rarely found among retailers. While we cannot give percentages, we know full well that our trade with the manufacturers is increasing as against the jobbers. As to the Eastern manufacturers gaining over the Western, we hardly think it is true in our case. We think the West is holding its own.

Referring to the proportion of purchases from the manufacturers and jobbers, respectively, a Hardwareman in this State writes:

I have never kept any exact account of the proportion of purchases made from manufacturers as separated from jobbers, but should think in Hardware it would be four-fifths; in Carriage-makers' material, as Wagon Tire, Springs, Wheels, Spokes, Rims, &c., the whole; in Tinware the whole; in Woodenware pertaining to House-Furnishing goods nearly all from the jobbers; in Brushes about half from each. I purchase where I can find the best goods for the money. Do not care whether from jobber or manufacturers, but am apt to find more goods with a jobber than a manufacturer.

The following letter from Illinois goes with some detail into the matter of purchasers from jobbers and manufacturers

and alludes to the important place held by the great Western jobbers:

In looking over our invoice book we find that from 1874, when we commenced business, until 1882 we bought nearly all our goods of New York and Philadelphia jobbers and Eastern manufacturers. Such firms as Landers, Frary & Clark, Reading Hardware Company, Sargent & Co., Oliver Bros. & Phillips, Biddle Hardware Company and others sent their men here regularly, and from them we bought a great many goods. But within the last six or eight years they have all quit coming here. Owing to the active competition between the rival cities of Chicago, Milwaukee and St. Louis for trade in this section we have been able to buy as cheap of them as we could in the Eastern markets for such quantities as we buy. The consequence is the Chicago and St. Louis jobbers have driven out their Eastern competitors. As an instance I might mention that a short time ago we wrote to H. Disston & Sons for price on eight dozen Saws. The Chicago jobber sold us the Saws 5 per cent. better delivered than Disston's quotation in Philadelphia. We, of course, buy Nails and Barb Wire in carlots from the manufacturer. Speaking of Nails I would say we have bought all our Nails from Centralia Illinois Mill for the past six years. Formerly bought them in Wheeling or Pittsburgh. With such firms as Simmons Hardware Company, St. Louis, and Hibbard, Spencer, Bartlett & Co., and Horton, Gilmore, McWilliams & Co., Chicago, with their large stocks and varied assortments, the retail merchant in this section who is a close cash buyer can do as well as by going further East and is in less danger of overstocking, as is often the case in buying of the manufacturer who offers a special 5 per cent. for quantities.

A well-known wholesale Hardware house of the Northwest gives the following general view of the situation as seen from their standpoint:

In our opinion the manufacturers each year are reaching a smaller class of trade than ever before, and a great many of them oftentimes sell to smaller dealers as cheap or cheaper than they do to jobbers. This habit seems to be growing and it has got about to the place where, on a great many line of goods, a good large retailer can buy them as cheap as the average jobber does. This, of course, does not seem a fair thing to the jobber, but in our minds it is nevertheless a true state of the case. And while we are glad to see that there are some notable exceptions to the rule, still the tendency is growing more and more the other way.

From a number of letters which we have received from merchants in various parts of the country we extract the following remarks in regard to the question, in which it will be seen that the matter is looked at from different standpoints:

Evansville, Ind.—As far as I observe, there is no change in the retailer's method of buying. All the retailers I am acquainted with, with a few exceptions, buy direct from the foundries or manufacturers. Drummers representing the manufacturers are as numerous as ever. Retailers now send their orders for odd plates for stoves to the jobber, sending also a collection of small broken orders, thus saving the dealer the trouble of writing to different parties and lessening express expenses, and generally these orders are more punctually attended to.

Penton, Mich.—So far as my experience goes I think that nine-tenths of all the goods are bought from jobbers. There are certain lines of goods bought now and then from manufacturers, such as Nails, Bar Iron, Glass, White Lead, Tinware, &c., but they are now-and-then purchases. Most of the country dealers buy in too small quantities to stock from manufacturers. Our orders are of numerous kinds and quantities and almost daily, so to deal with manufacturers is out of

the question; and then there is no speculative tendency with dealers in laying in stock with an expectation of an advance. Hence the often purchasing for daily wants.

Wellston, Ohio.—From our personal observation we do not find any advantages in dealing direct with the manufacturers, as the jobbers are able to offer the same inducements as the manufacturers. Believe the jobbing business to be on the increase in our locality.

Ithaca, N. Y.—We buy more goods from the manufacturers than formerly. We do not keep a record of the amount we buy from the jobber or manufacturer, but our opinion is that three-fourths of our trade is with the latter. It seems as if the manufacturers are making a greater push than ever to deal direct with the retail trade; they don't like the extreme cutting the jobber indulges in.

Wichita, Kan.—We purchase mostly from jobbing houses, especially Shelf Hardware. Pieced Tinware mostly from manufacturers, while we get most of our Stamped Tinware from jobbers. Granite Ironware we get from jobbers, while Stoves and Nails are bought direct from the manufacturers. Some lines of goods we can purchase cheaper from the jobber than from the manufacturer. Other lines we can purchase cheaper from manufacturers than jobbers. In heavy goods we think we can do better by dealing directly with the manufacturer as a general rule. For instance, purchasing Wheelbarrows from the manufacturer we receive them in better shape than when we get them from jobbing houses, as they are not handled so often.

Springfield, Mo.—Our business is almost entirely jobbing. We intend to and do buy all our goods direct from manufacturers. Cutlery, &c., we import through New York houses. Should think much the larger proportion of our purchases were west of Buffalo, as we buy all staples and heavy goods West, except Burden's Horseshoes. Some Axes, Scythes and Shelf Goods come from New York State and New England.

Cooperstown, N. Y.—So far as my experience goes in regard to purchasing directly from manufacturers, I buy no more goods from them direct than I did five years ago. But a few years ago nearly all my purchases were made from jobbers, but gradually this was changed, and for the last five years nearly all my goods were bought from manufacturers, and the purchases from jobbers are in smaller quantities. I find that I cannot easily get along without the jobber, as my orders are more assorted and I find it very convenient to make up my orders of assorted goods from them.

Willmar, Minn.—I am of the opinion that the table of Fred. P. Straub & Co. is as true a reflection of the general tendency of trade, as between manufacturer and jobber, as it would be possible to produce.

Arrangement of Stores.

The accompanying illustrations, Figs. 289 and 290, relate to a method of managing Glass, as described by H. G. Hall & Son, Boston, Mass. It will be observed that the Glass Rack, which may be di-

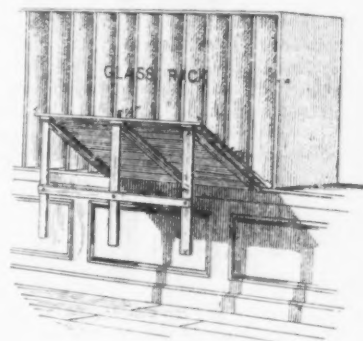


Fig. 289.—Glass Rack and Folding Table.

vided into a greater variety of partitions than are shown in the illustration, is placed upon the counter, and the Glass Board is arranged so that it can be readily placed in position for use, or raised up out of the way so as to rest against the front of the Glass Rack. The illustration, Fig. 289, shows it let half-way down. Fig. 290 represents the face of the Glass Board, which has a raised edge on two sides. Rules

29 and 47 inches, respectively, are set in flush with the face of the board in the manner indicated, thus giving a convenient arrangement for measuring and cutting the glass. The board is attached to the counter by Chest Hinges, the supports or legs in front being attached by

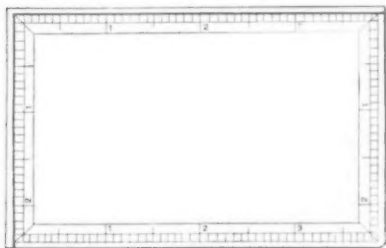


Fig. 290.—Top of Glass Table.

Back Flaps. There is a hook and eye, as indicated in Fig. 289, for the purpose of holding the board close up to the Glass Rack. The entire length of the Glass Board is 48½ inches, and its entire width 30¼ inches.

From F. A. Herrick, who has been for a number of years with Warner & Dodge, Jackson, Mich., we have the description of a rack for displaying Pumps and other goods, which is shown in Fig 291. The rack is made by taking a piece of 4 x 4

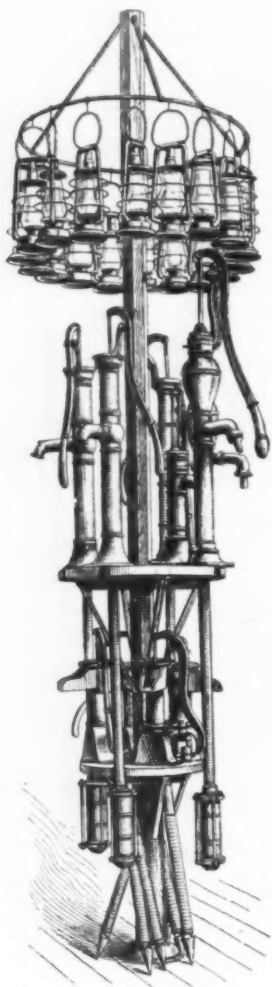


Fig. 291.—Method of Displaying Pumps, &c.

timber and beveling the corners and making it of such a length that will reach from floor to ceiling, when it is fastened securely at top and bottom. The first shelf is 34 inches from floor and is made of 1½-inch plank and is 21 inches in diameter, with cleats nailed to the post under the shelf, and four iron braces 18 inches long

underneath running from the outside of the shelving to the post. Holes are bored near the outside of the shelf to let the pipe to the Pumps on the top shelf reach in, so as to hold them in place. The top shelf is made the same as the bottom except that it is 28 inches in diameter. Well Pumps are placed on the top with holes or notches for the pipe to fit in, and, being larger than the bottom, the lower ends of the Pumps fit into the notches on the lower shelf. Cistern Pumps are placed on the lower shelf, as shown in the cut. By this arrangement it will be seen that the lower shelf will easily hold four Pumps and the upper shelf four to six. Near the top of the post a round iron hoop is supported by iron braces attached at the top. On this hoop Lanterns are hung, a wire hook bent around the rod

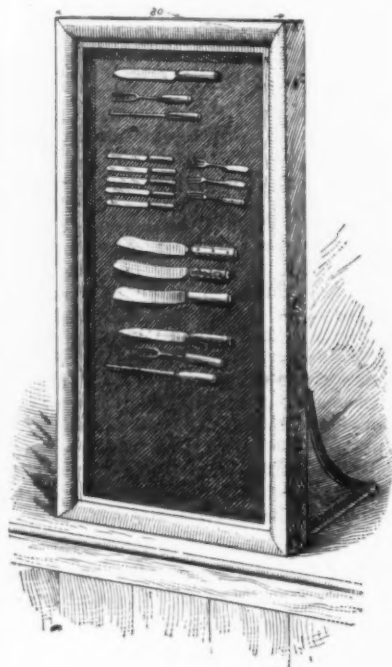


Fig. 292.—Counter Show Case.

being used to attach them. Screw hook are also inserted in the ceiling, making a somewhat larger circle, and from these Lanterns are also suspended, making, it is stated, a very attractive display. This second circle of Lanterns is not, however, shown in the illustration. The economy of space that is thus secured is another feature of this arrangement.

From S. W. Snodgrass, Mifflensburg, Pa., we have received the description of the Counter Showcase which is represented in Fig. 292, which he has in use and to the merits of which he refers. The general form and purpose of the case may be gathered from the illustration. The Cutlery is fastened to a door which hinges so as to open whenever a change of goods is desired. The door is trimmed or painted black to secure an effective contrast, and the goods are attached by means of a brass wire or in any other suitable way. The glass in front protects the goods from exposure and handling. This method is referred to as desirable for displaying holiday Cutlery, having one case devoted to Carvers, another to Pocket Cutlery, another for Butcher Knives, another for Shears, &c., but the same method can obviously be used with a varied line of goods. It is suggested that several doors might be made to fit the same case, as they are hung on loose joint butts, thus permitting a change of goods easily and quickly.

Another design of Mr. Snodgrass's is shown in Fig. 293, which represents a method of displaying and accommodating

Saws. From the illustration it will be seen that the shelving in which the stock is held extends to the height of 54 inches from the floor, there being above a case, in which, on a black background, Saws are exhibited the entire height of the structure from floor to ceiling. The Saw case thus occupies the vacant space usually above shelving, which in this way is put to good use, giving an effective display and adding much to the general appearance of the store. The drawers in the upper part of the shelving are devoted to Back Saws, Hand Saws, &c. The manner in which the Cross-Cut Saws are placed in the lower and larger divisions is indicated in the engraving.

Exports.

BY SHIP JOAQUIN, OCTOBER 13, 1888, FOR SIDNEY, N. S. W. (Continued).

By McLean Bros & Riggs.—5½ dozen Locks, 13 dozen Bench Screws and Mouse Traps, 104 dozen Pulleys, 4 dozen Wringers, 46 dozen Axes, 1 dozen Pumps, 12 dozen Screw-Drivers, 6 Guns, 18 Clocks, 24 dozen Hammers, 31 dozen Saws, 48 sets Axes, 12 dozen Axes, 13 cases Agate Ware, 9000 Bolts, 2 dozen Vises, 20 dozen Washboards, 35 dozen Axes, 11,000 Bolts, 3 dozen Match Boxes, 30 dozen Handles, 5 dozen Hammers.

By Strong & Troubridge.—4 cases Hardware, 2 cases Picks, 10 cases Hardware, 1 case Nails, 1 case Locks, 3 cases Hardware and Cutlery, 6 cases Firearms, &c., 1 case Hardware, 1 case Lampware, 5 cases Cartridges, 2 cases Hardware, 1 case Cutlery, &c., 1 case Carriage-Ware, 25 cases Axes, 1 barrel Glue, 55 cases Axes, 1 case Nails, 2 cases Wringers, 2 cases Hardware, 1 barrel Pulleys, 40 cases Axes.

By V. Basanta.—6000 packages Tacks, 784 pounds Nails, 5 gross Rat Traps, 6 dozen Cranks and Rollers, 3 dozen Well Wheels, 6 gross Rat Traps, 10 dozens Axes, 6 Clocks, 10 dozen Shovels, 1½ gross Hat Racks, 12 Rifles, 200 Clocks, 114 dozen Slates, 60 dozen Shovels, 5 gross Wire Goods, 54 Rifles, 2 cases Ammunition and Tools, 40 gross Fruit

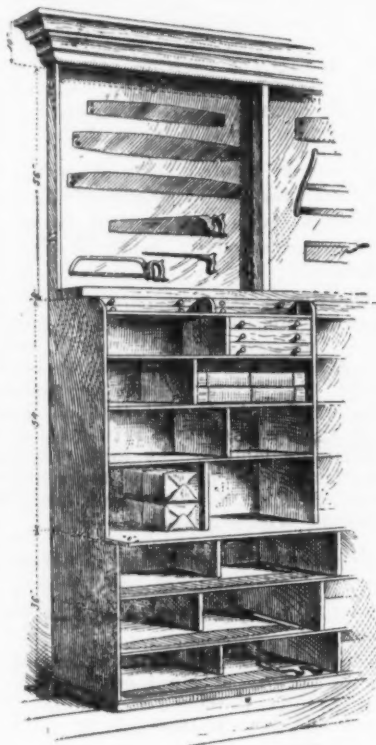


Fig. 293.—Saw Case.

Jars and Trimmings, 17 dozen Axes, 22 dozen Wrenches, 12½ gross Axle Grease, 12 Clocks, 50 Lamps.

By R. W. Cameron & Co.—35 crates Fruit Jars, 11 cases Hardware, 1 case Whips, 12 boxes Hardware, 8 crates Wheels, 2 cases Machinery, 5 cases Hose, 1 case Hardware, 13 packages Hardware, 1 case Whips, 2 cases Whip Handles, 36,861 pieces Roofing Slate.

By Coombs, Crosby & Eddy.—12 dozen Pump Parts, 6 dozen Axes, 2 Corn Shellers, 2 dozen Axes, 15 dozen Handles, 1 dozen Spades, 6 dozen Shade Rollers, 5 dozen Washboards, 6

dozen Axle Grease, 5 dozen Hardware, 7 dozen Hardware, 2 dozen Hoes, 1 gross Stove Polish, 35,000 Cartridges, 20 dozen Edge Tools, 60 dozen Edge Tools, 10 dozen Axes, 39 Churns, 102 Stoves, 4 dozen Picks, 10 dozen Carpenters' Tools, 10 dozen Bird Cages, 2 dozen Wringers, 2 dozen Lawn Mowers, 15 dozen Hammers, 168 pounds Oil Stone, 672 pounds Nails, 9 dozen Hardware, 2 dozen Grindstones, 69 dozen Hardware, 31 dozen Edge Tools, 20 gross Stove Polish, 5 dozen Carpenters' Tools.

By *Arkell & Douglas*.—300 dozen Handles, 1 dozen Perambulators, 3 dozen Shellers, 6 dozen Handles, 200 dozen Tools, 11 dozen pairs Roller Skates, 10 dozen Tools, 40 dozen Hammers, 1 gross Rat Traps, 3 dozen Shellers, 18 cases Carriage-Ware, 3 dozen Hay Knives, 32 dozen Tools, 72 dozen Handles, 2 dozen Corn Mills, 24 dozen Saws, 11 dozen Forges, 12 dozen Axes, 6 dozen Grindstone Fixtures, 784 pounds Hardware, 38 pounds Hardware, 18 dozen Squeezers, 15 dozen Axes, 18 dozen Brushes, 504 dozen Handles, 55 dozen Washboards, 1016 pounds Hardware, 20 Corn Mills, 88 dozen Hardware, 40 dozen Shovels, 35 dozen Axes, 3 dozen Churns, 85 dozen Whips, 20,000 Cartridges, 30,000 Primers, 500 pounds Hardware, 6 gross Blacking, 755 pounds Castings, 100 dozen Whips, 13½ dozen Harness, 4 dozen Brushes, 138 pounds Wagon Springs, 24 dozen Braces, 10 dozen Bird Cages, 1 dozen Air Guns, 898 pounds Hardware, 36 dozen Hoes.

By *W. H. Crossman & Bro.*—2 Drilling Machines, 96 dozen Mouse Traps, 50 dozen Shovels, 1 dozen Vises, 1 case Tinsmiths' Tools, 12 dozen Mop Holders, 100 Clocks, 2 dozen Grindstone Fittings, 1 dozen Wringers, 2 dozen sets Reloading Tools, 70,000 Primers, 30,000 Cartridges, 12 dozen Bird Cages, 6 dozen Rolling Pins, 10 dozen Potato Mashers, 1 dozen Vises, 2 dozen Meat Cutters, 630 dozen Files, 2635 pounds Nails, 1 dozen Stove Trucks, 1 dozen Washers, 75 boxes Axes, 75 dozen Hatchets, 62 dozen Picks, 12 dozen Carpenters' Tools, 6 cases Hardware, 5 cases Carpenters' Tools, 3 packages Lamp Goods, 412 pounds Oil Stone, 1 dozen Wringers, 2 cases Hardware, 4 dozen Picks, 7 Scales, 18 dozen Washboards, 2 packages Carpenters' Tools, 6 dozen Cow Bells, 12 dozen Mouse Traps, 16 dozen Hatchets, 336 pounds Oil Stone, 1 case Chalk Lines, 20 dozen Axes, 36 dozen Files, 2 dozen Corn Shellers, 110 dozen Shovels, 50 dozen Washboards, 6 dozen Grindstone Fittings, 2 dozen Meat Cutters, 1 dozen Lawn Mowers, 10 packages Carpenters' Tools, 4 cases Hardware, 4½ dozen Sad Irons, 56 Corn Shellers, 3 dozen Stove Trucks, 5 dozen Wringers, 1½ dozen Wrenches, 23 packages Lamp Goods, 60 Stoves, 36 dozen Mouse Traps, 3 dozen Fluters, 16 dozen Picks, 28 dozen Hatchets, 4 packages Carpenters' Tools, 3 cases Hardware, 7 crates Carriage-Ware, 1 case Carriage Hardware, 90 dozen Shovels, 2 cases Hardware, 5 dozen Axes, 3 cases Carpenters' Tools, 1 dozen Guns, 18 sets Reloading Tools, 60,000 Primers, 10,000 Cartridges, 5 dozen Bird Cages, 1 dozen Perambulators, 1 case Tinsmiths' Tools, 30 dozen Mouse Traps, 96 dozen Handles, 6 dozen Wrenches, 10 dozen Mop Holders, 6½ dozen Saws, 5 dozen Thermometers, 5 dozen Bush Hooks, 560 pounds Nails, 18 dozen Picks, 30 dozen Axes, 30 Guns, 30 sets Reloading Tools, 100,000 Primers, 6 dozen Files, 2 dozen Tills, 6 dozen Shovels, 24 nests Pails, 1 case Hardware, 8 cases Carpenters' Tools, 20 dozen Handles, 4 dozen Picks, 940 pounds Tacks, 9 dozen Razor Stroops, 235 pounds Oil Stone, 20 dozen Shovels, 20 dozen Handles, 24 Guns, 30,000 Cartridges, 3 dozen Tills, 10 dozen Axes, 8 packages Hardware, 2 cases Carpenters' Tools, 27 cases Hardware, 195 packages Carriage-Ware.

PER BARK MATHILDE HEMING, OCTOBER 15, 1888, FOR LITTLETON, NEW ZEALAND.

By *H. W. Peabody & Co.*—13 packages Hardware, 3 packages Agricultural Implements, 3 packages Lampware, 72 dozen Handles, 2 dozen Razors, 42 packages Carriage-Ware, 20 packages Hardware, 105½ dozen Handles, 1 case Plated-Ware, 1 case Agricultural Implements, 5 cases Stone, 4 cases Wringers, 13 packages Hardware, 6640 pounds Nails, 1 case Flint Paper, 3 packages Hardware, 5 tons Twine, 50 dozen Handles, 40 dozen Handles, 10 dozen Shovels, 14 packages Hardware, 1375 pounds Horse Nails, 15 packages Stoves and Wicks, 20 dozen Shovels, 132 dozen Handles, 8 cases Wringers, 1 bundle Whetstones.

By *Coombs, Crosby & Eddy*.—2 dozen Hatchets, 5 dozen Washboards, 5 dozen Brooms, 1 dozen Shovels, 29 pounds Twine, 16 Blocks, 7 dozen Carpenters' Tools, 5 dozen Edge Tools, 7 dozen Lamp Goods, 1 dozen Oil Stoves.

By *R. W. Forbes & Son*.—40 packages Hardware, 475 pounds Horse Nails, 16 packages Stoves, 1 dozen Mallets, 1 case Forges, 711

pounds Carriage Bolts, 21 dozen Hammer Handles, 1 case Plated-Ware, 2 dozen Sash Cord, ½ gross Egg Beaters, ½ dozen Store Trucks, 2 dozen Sad Iron Handles, 7 packages Hardware, 4 cases School Slates, 1 case Agricultural Implements, 1 case Carriage Hardware, 20 cases School Slates, 1 case Carriage Hardware.

By *Arkell & Douglas*.—4 dozen Axes, 12 dozen Locks, 3 dozen Pumps, 15 pounds Sash Cord, 1 dozen Braces, 30 dozen Handles, 3 dozen Saws, 12 dozen Hammers, 1 dozen Wringers, 26 dozen Locks, 192 dozen Handles, ½ dozen Mills, 10 dozen Shovels, 24 dozen Axes, 12 dozen Picks, ½ dozen Mangles, 8½ dozen Hog Rings, 1205 pounds Bolts, 1 case Drills, 700 pounds Horse Nails, 116 pounds Wagon Springs, 6 dozen Hinges, 3 dozen Churns, 4½ dozen Blocks, 6 dozen Molasses Gates, 2 dozen Lamp Goods, 2 dozen Mallets, ¾ dozen Cultivators, 31 dozen Lampware, 4 dozen Axes.

By *A. Field & Co.*.—156 pounds Malleable Castings, 30 sets Rims.

By *Charles Brewer & Co.*.—7 cases Carpenters' Tools, 4 cases Handles, 1 case Hardware.

By *Healy & Earl*.—4 boxes Reaper Extras.

By *Dunbar, Hobart & Co.*.—3360 pounds Nails.

By *D. D. Pratt*.—600 gross Chalk Crayons.

PER BARK ALICE REED, OCTOBER 18, FOR DUNEDIN, NEW ZEALAND.

By *H. W. Peabody & Co.*—21 packages Hardware, 3360 pounds Axle Grease, 4 packages Lampware, 8 packages Carriage-Ware, 33 packages Stoves, 1 case Wood-Working Machinery, 40 dozen Handles, 10 dozen Shovels, 250 pounds Twine, 75 boxes Horse-Nails, 2 cases Hardware, 600 pieces Stoves, 1 case Flint Paper, 204 pounds Wire, 125 dozen Brooms, 7 cases Hardware, 65 cases Hardware, 4 cases Churns, 8860 pounds Bolts, 62½ sets Axes, 33 packages Carriage-Ware, 1 case Machinery, 2 cases Brooms, 10 dozen Shovels, 4 cases Agricultural Implements, 4423 pounds Axle Grease, 26 packages Tacks and Nails, 4 cases Wringers, 42 dozen Handles, 28 packages Stoves, 1 case Pumps, 4 packages Lampware, 22,400 pounds Wire.

By *Chas. Brewer & Co.*.—23 cases Handles, 1 case Hardware, 7 cases Agricultural Implements, 16 cases Nails, 16 cases Tools, 1 Chain Pump, 3 cases Scales, 1 case Hardware, 1 case Flint Paper, 1 case Handles, 1 case Tools, 3 cases Carriage Hardware, 1 case Handles, 11 cases Hardware, 1 case Sandpaper, 1 case Tools, 17 cases Nails, 1 case Mangles, 1 case Nails, 1 case Tools, 9 packages Creamery Goods, 43,055 pounds Wire, 8877 pounds Wire, 2 cases Agricultural Implements, 8 cases Nails, 10 cases Hardware.

By *Arkell & Douglas*.—2000 spokes, 3 dozen Whiffletrees, 36 sets Hubs, 100 pounds Carriage Hardware, 200 pounds Hardware, 3 dozen Harness Hardware, 36 dozen Whip Handles, ½ dozen Mallets, 12,984 pounds Barb Wire, 11,200 pounds Barb Wire, 2 dozen Hay Knives, 10 dozen Shovels, 70 dozen Handles, 10 dozen Wringers, 1 Scale, ¾ dozen Wheels, ¾ dozen Drills, 4 packages Lampware, ¾ dozen Ranges, 1 case Carriage-Ware, 30 sets Rims, 112 pounds Nails, 20 dozen Lampware, 3 cases Hardware.

By *W. H. Crossman & Co.*.—8 packages Lamp Goods, 3 cases Slates, 2 gross Fruit Jars, 18 dozen Handles, 52 dozen Clocks, 8 cases Plow Parts.

By *Strong & Trowbridge*.—1 case Hay Forks, 1 case Wringers, 2 cases Hatchets, 1 case Wrenches, 1 case Pumps, 1 case Brace Bits, 1 case Hammers, 1 case Axle Grease, 1 case Nails, 1 case Handles, 6 cases Handles, 1 case Hardware, 2 cases Axes, 1 case Pumps, 1 case Whetstone, 5 cases Hardware, 1 case Paint Mills, 2 cases Carriage-Ware, 8 cases Nails, 1 Bale Twine, 7 cases Hardware, 2 packages, 1 case Hardware, 1 case Hardware, 9 packages Lampware, 7 cases Hardware, 1 case Forks, 1 case Saws, 3 packages Churns.

By *W. K. Freeman*.—10 cases Grease, 6114 pounds Horse Nails, 624 pounds Hardware, 10 crates Churns, 400 pounds Bolts, 828 pounds Axes.

By *R. W. Forbes & Son*.—5 packages Axes, 200 pounds Horse Nails, 120 dozen Axe Handles.

By *R. W. Cameron & Co.*.—1 case Cutlery, 1 box Castings, 2 boxes Carriage Hardware.

By *A. Field & Co.*.—18 dozen Toys, 12 gross Tinware, 7 dozen Fire Sets, 6 dozen Shovels, 5 dozen Mouse Traps, 4½ gross Tinware, 1 dozen Tools.

By *New Haven Clock Company*.—1 case Clocks.

By *Ansonia Clock Company*.—25 boxes Clocks, 23 boxes Clocks, 44 boxes Clocks.

By *A. S. Lascelles & Co.*.—2 cases Crayons, 15 packages Lampware, 9 pairs Skates.

By *Stover & Tyler*.—14 packages Cordage.

By *B. W. Hartman*.—37 cases Nails.

By *Welsh & Lea*.—12 cases Handles.

On the Chemical Processes Involved in the Rusting of Iron.*

In this short paper there is, so far as I know, no new fact described. I believe everything, or nearly everything, in it is to be found in the records of chemical research; but as I find that the process involved in the rusting of iron is often misunderstood, and that the known facts have not been put together in their connection, I have thought it might be worth while to do so. My attention was first called to the subject by observing what happens when a drop of rain falls on a clean bright surface of iron. At first, for a short time, the drop remains clear, and the bright surface of the iron is seen through it; but soon a greenish precipitate forms in the drop, and this rapidly becomes reddish-brown. The brown precipitate does not adhere to the iron, but is suspended in the water, and becomes a loosely adherent coating only when the water has evaporated. I may premise, that in speaking of rusting, I mean the formation of rust on the surface of metallic iron exposed to ordinary atmospheric conditions. I do not intend to treat of the corrosion of iron by substances such as sulphuric or sulphurous acid, hydrochloric acid, or any other occasional impurities which may be present in the air. It has been conclusively shown that the necessary conditions of rusting are: (1) metallic iron, (2) liquid water, (3) oxygen and (4) carbonic acid, both the latter being dissolved in the liquid water. Iron remains quite free from rust in an atmosphere containing oxygen, carbonic acid and water vapor, as long as the water vapor does not condense as liquid water on the surface of the iron.

Let us consider now the action on iron of the three substances, liquid water, oxygen, carbonic acid, singly, and then two and two. Liquid water, quite free from dissolved gases, does not act on iron at ordinary temperatures. At high temperatures, very rapidly at a red heat, iron is oxidized by water or water vapor, and is converted into the magnetic oxide of iron. This magnetic oxide is formed on the surface of the iron as an adherent coating, and only when it is detached can the water gain access to the lower layers of the iron. Oxygen gas alone does not act at ordinary temperatures on iron. At high temperatures it also converts the iron into the magnetic oxide, which forms an adherent coating. The same is the case with carbonic acid gas, acting alone. At ordinary temperatures it is without action. At high temperatures the carbonic acid is reduced to carbonic oxide, and the iron is oxidized to magnetic oxide, which forms an adherent coating. Liquid water with oxygen dissolved in it does not act at ordinary temperature on iron. This is shown by the fact that ordinary water exposed to the air does not rust iron if the water contains a substance such as lime, or caustic alkali, capable of combining with carbonic acid and itself without action on iron. As long as the lime or caustic alkali is there no rusting occurs. When the lime or caustic alkali has been converted by the carbonic acid of the air into carbonate, then, and not till then, can the carbonic acid of the air dissolve as such in the water, and then, and not till then, does rusting begin. Water containing carbonic acid dissolved in it acts on iron at ordinary temperatures, forming ferrous carbonate, which dissolves in the carbonic acid water, forming, no doubt, ferrous bicarbonate. In this way artificial chalybeate water has been prepared by shaking up finely divided iron with carbonic acid water. In this action hydrogen gas is

* Paper presented by Prof. A. C. Brown at the Edinburgh meeting of the British Iron and Steel Institute.

given off. Solutions have been thus prepared containing nearly one-tenth per cent. of iron. If oxygen is present dissolved in the water it will unite with the nascent hydrogen, and if we have sufficient water, iron and carbonic acid, the whole of the dissolved oxygen will be thus consumed. The presence of dissolved oxygen quickens the solution of the iron, the tendency of the oxygen to combine with the nascent hydrogen supplying an additional motive to the action.

Probably in ordinary rusting no hydrogen actually becomes free, as under ordinary conditions there will always be enough dissolved oxygen to convert all the nascent hydrogen into water. When a solution of ferrous bicarbonate is exposed to an atmosphere containing neither free oxygen nor carbonic acid it loses carbonic acid, and insoluble ferrous carbonate is precipitated. If free oxygen is present in the atmosphere to which it is exposed the ferrous carbonate is oxidized into ferric hydrate, carbonic acid being given off. This, if the water is not already saturated with carbonic acid, dissolves in the water. We can now follow the whole process of rusting and divide it into stages—these stages being really separable, if we take proper precautions, but in the usual case overlapping one another. We have (1) the formation of soluble ferrous bicarbonate; (2) the conversion of ferrous bicarbonate into ferric hydrate, the white ferrous carbonate passing through green and black intermediate substances into the reddish-brown ferric hydrate—i.e., rust. We have to note that the carbonic acid dissolved in the liquid water, which is necessary for the process of rusting, is not used up in the process. It is given off during the oxidation of the ferrous bicarbonate to ferric hydrate, and is thus ready to act on the new surface of the metallic iron. The continuation of the process of rusting is not therefore dependent on new carbonic acid absorbed from the air, but the original carbonic acid, if not removed, can carry on the process indefinitely, as long as liquid water is present, and oxygen is supplied from the air. Once the process is started it goes on more rapidly, because the porous rust not only does not protect the iron, but favors, by its hygroscopic character, the condensation of water vapor from the air as liquid water. A piece of iron, therefore, which has begun to rust will continue rusting in an atmosphere not saturated with water vapor, an atmosphere in which a piece of clean iron will not rust, because liquid water will condense on the hygroscopic rust from such an atmosphere, but not on the bright iron.

The copper wire department of the plant of the Hartman Steel Company, Limited, at Beaver Falls, Pa., is being operated to its full capacity, with plenty of orders on hand.

Messrs. James W. Queen & Co., of Philadelphia, Pa., have just issued a special catalogue devoted to chemical apparatus, assayers' materials and general laboratory supplies. The publication is undoubtedly one of the most complete of the kind that we have seen, and to the scientific worker will be of considerable value and convenience. A large number of illustrations are given of different appliances in current use, together with sizes, prices and, in some cases, brief descriptions. On one of the opening pages of the catalogue we notice a somewhat peculiar announcement to the effect that the catalogue will be mailed upon application to any address on receipt of 50 cents, but it is explained immediately after that this will be deducted from the first purchase amounting to \$10 or more, so that practically the catalogue will be delivered free of charge.

Fire-Proof Buildings.

The value of fire-proof buildings in a large city is certainly a question well worthy of consideration as regards its bearing upon fire-insurance interests and the reduction of losses. Not only impervious to fire from within, they offer in case of large conflagrations an equally effective barrier to the passage of the flames in their destructive course. The natural stages of growth through which a city has to pass in the course of its natural development is essentially the same. First the gathering of a few humble cottages, then the post office, general store, &c., until the aggregation of numbers swells into, first, the village, then the town or city. Some may take longer to develop than others, but the steps noted are essentially the same. Naturally, at the outset no restrictions could be placed upon the first settlers as to precautions against fire in the erection of their homes. For the most part the latter are humble in the extreme and in the event of loss could be easily replaced at no great expense. The community interest—that arising from the contiguity of buildings—does not exist until a later period, when the land has grown so valuable that buildings adjoin. Business blocks at the outset are built of wood, on the score of cheapness, but as the town prospers new buildings of brick or stone begin to make their appearance; and, like the strata in the rocks, the different types of wood, brick and stone structures mark the eras of a city's growth. Old as is New York City, this is also true in regard to it, and sandwiched in among some of its most substantial and solid business edifices can still be seen here and there the gable-roofed frame building put up many years ago for a farmhouse.

It is evident, then, that the fire-proof building is the outcome of the higher evolution of cities. A certain combination of factors are needed before such buildings can be reasonably looked for. A city can protect its interests to some extent by building ordinances which forbid the erection of frame structures within certain limits, but it cannot specify as to the expense an owner shall go to in construction. He may put up a brick building, keeping just within the limit of the law, and yet have a structure that is just as easily destroyed as the prohibited frame. Such buildings are put up purely for speculative purposes, and the builder has no interest in them save as to the extent of profit the transaction will yield. The great objection to the general introduction of fire-proof buildings is their much higher cost. This has been lessened to some extent by the introduction of new and cheaper fire-proof materials, but there is still ample room for further improvement. The average property-owner is guided in his choice of a building by the item of interest to be returned upon the capital invested. As a rule, it is the wealthy corporations, or individuals, who are content with a fair rate of interest: that can be relied upon as permanent who indulge in fire-proof buildings. There is not a structure of this description in New York City that has not been constructed by one of these classes, and the rule doubtless holds good everywhere. No laws or municipal ordinances can ever be effective in dealing with the fire danger other than in requiring certain conditions in building as a matter of precaution, such conditions being merely the avoidance of known sources of danger in construction. The fire-proof structure, if absolutely fire-proof, would require no insurance whatever; but there is the added cost of erection, the interest on which must be taken into account when the saving in fire premiums is to be calculated. The same rule also holds

good in regard to buildings supplied with automatic devices for the suppression of fires. The cost of the plant and the interest thereon must not be forgotten. This is exemplified in the case of the mill mutuels.

It is evident, then, that the sporadic erection of fire-proof buildings can have but little effect upon the cost of insurance to the general public. Not until such buildings become so general as to have an effect upon the hazard, by materially lessening the danger of a fire spreading, would it be worth while to take them into consideration in the matter of reducing premiums—the more so as these buildings paid no premiums for protection themselves, and consequently were not a source of profit to the companies. In point of fact, a great many buildings supposed by their owners to be fire-proof are far from being such. A building to be fire-proof in the true sense of the word is one in which the materials are actually impervious to the action of fire. The conflagration in Chicago proved that so-called fire-proof buildings were actually worthless when put to the test. Iron fronts curled up like paper under the fierce heat. Granite blocks cracked and split apart under the same influence, leaving the contents of the building quickly exposed to the devouring element. It would seem, then, that the study of the future of the various building materials employed and their value from the underwriters' standpoint in determining the rate to be charged would be well worthy of careful attention in connection with the inspection of buildings at the time of their construction. Fire insurance, like many other branches of business, has been brought to such a point through close competition that it requires the greatest skill in management to yield a fair return on the money invested. The careful study of questions connected with the business that were formerly considered as not worth noticing will at the present day often determine the result of a net gain or actual loss at the end of the year.

The D. Moore Company, Limited, of Hamilton, Ont., favor us with one of the 1888-89 wholesale price lists of their manufactures. The catalogue is a convenient-sized pamphlet, bound in cloth, and a feature that commends itself especially, is the ledger indexing, by means of which the quickest reference may be made to the contents. To show the character and extent of the goods enumerated, we will repeat the section headings as they appear on the ledger index: Stamped Ware, Spoons, Tinnings' Trimmings, Japaned-Ware, Miscellaneous Goods, Copper and Brass Goods, Wire Goods, Galvanized and Sheet-Iron-Ware, Agate Enamel-Ware, Milk Can and Creamery Can Trimmings, Pieced Tinware, Tools, Machines and Coal-Oil Stoves. The pamphlet is illustrated throughout, and full price lists are given, together with brief descriptive particulars where necessary. A further alphabetical index is provided at the back of the book, while the front page is a discount sheet with a general price list for 1888.

From the Marquette (Mich.) *Mining Journal*, of the 20 ult., we take the following table, showing the shipments by ports up to date this season, in comparison with shipments for the corresponding portion of the two preceding years:

Port.	1886.	1887.	1888.
Marquette.....	730,238	740,947	779,73
Escanaba	1,841,215	1,846,537	1,340,020
St. Ignace	102,313	86,030	68,081
Ashland, Wis..	932,322	988,036	653,204
Two Harbors, Minn.....	368,385	357,744	279,941
Total.....	3,974,473	4,020,224	3,121,069

Gould's New Deluge Suction and Lift Pumps.

Fig. 1 of the accompanying illustrations represents the new deluge pump of the Goulds Mfg. Company, Seneca Falls, N. Y., and is designated as their No. 829 in their new catalogue. It is designed for shallow or small vessels of not more

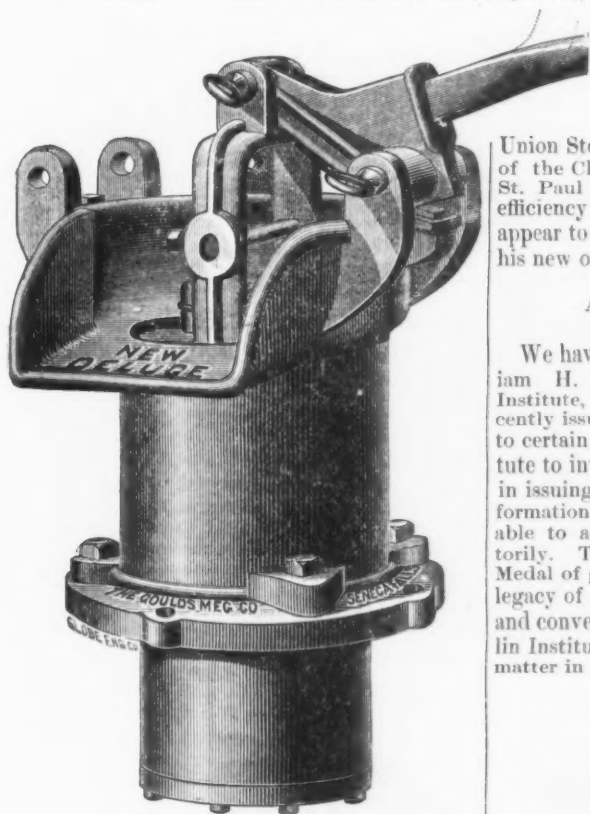


Fig. 1.—New Deluge Suction and Lift Pump.

than 15 to 20 feet depth of hold, for contractors who wish to pump large quantities of water from excavations, and for irrigation where a compact and capacious pump is desirable. The cylinder is lined with brass, the valves rubber faced, and the lever socket made at such an angle that the bent wrought-iron lever when put in one side up is right for ordinary pumping, and by simply changing it to the other side up it becomes a vertical lever. This lever may also be worked from three different points, as shown by the lugs in the cut. The pump has large valves, accessible and removable by hand from above, while to the bottom of the base is bolted a flanged screw which may be for any size of pipe ordered, or changed for other sizes if desired. The pump is made in two sizes, 6 and 8½-inch cylinder with 4 and 6-inch stroke. It is also made with elevated base to be used above deck, or foundation where it is desired to use hose connection, or more convenient to make pipe connections in this manner. Fig. 2 represents the pump with the addition of a heavy forked rod, adapting it for power as well as hand use. This forked rod may be connected to wood rod of windmill walking beam or other power, and operated in any place where the water is not more than 25 feet distant for irrigation, excavations, &c. It is also made with elevated base for attaching hose or wrought-iron pipe at side. Fig. 3 shows the pump surmounted with a strongly bolted heavy frame supporting bearing boxes with crank shaft, spur and pinion gears below, &c. The capacity of this pump is from 3000 to 4000 gallons of water per hour.

Myron J. Carpenter, general agent of the Union Steel Company, of Chicago, for

the past year, has been appointed general manager of the Duluth and Iron Range Railroad, over which the Vermillion Range iron ores are taken on their way to market. The *Railway Age* states that few men have had such varied experience in the railway service as Mr. Carpenter, he having been at various times telegraph operator, station agent, shop clerk, store-keeper, traveling auditor, superintendent, agent for freight, &c., during a score of years. The last railway position he held before entering the service of the

Union Steel Company was superintendent of the Chicago Division of the Chicago, St. Paul and Kansas City Railway. His efficiency in previous official stations would appear to be a guarantee of his success in his new one.

Awards to Inventors.

We have received through Mr. William H. Wahl, Secretary of Franklin Institute, of Philadelphia, a circular recently issued in which attention is directed to certain awards in the gift of the Institute to inventors and others. The object in issuing the circular is to make the information more public, and in that way be able to award the medals more satisfactorily. The first is the Elliott Cresson Medal of gold, which was founded by the legacy of Elliott Cresson, of Philadelphia, and conveyed to the trustees of the Franklin Institute. The committee having the matter in charge, after proper investiga-

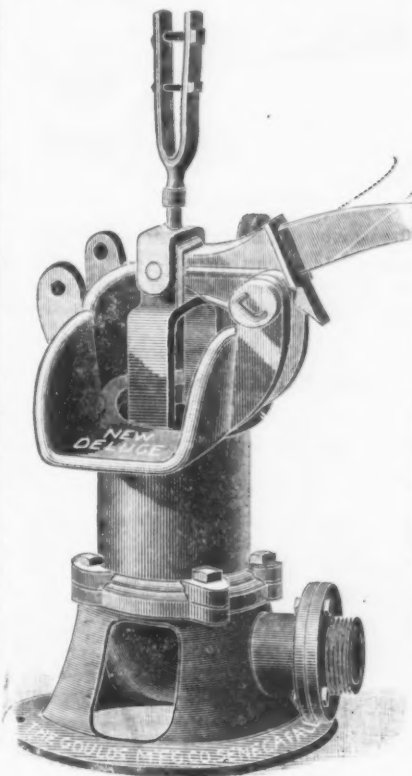


Fig. 2.—Deluge Pump, for Manual or Wind Power, with Side Inlet.

tion, grant the medal either for some discovery in the arts and science, or the invention or improvement of some useful machine, or some new process of combination of material and manufactures, or for the ingenuity and skill of architectural workmanship. In this enumeration it will be seen that a very extensive field is covered, and that applications may properly come from a very great number of sources. The second award is the John Scott legacy, premium and medal, which is \$20 and a medal of copper. This was founded in

1816, the specifications of the donor being "that it should be given to the most deserving." This award is in trust of the city of Philadelphia, but is given under the advice and recommendation of a committee of the Franklin Institute. As it was stated, the circular of Mr. Wahl is to make public these facts, and the object of getting as many applications as possible. Any person interested in these awards, by addressing the Secretary of the Franklin Institute, will receive fuller information respecting the manner of making application, and the Committee on Science and Art will give attention to reports upon

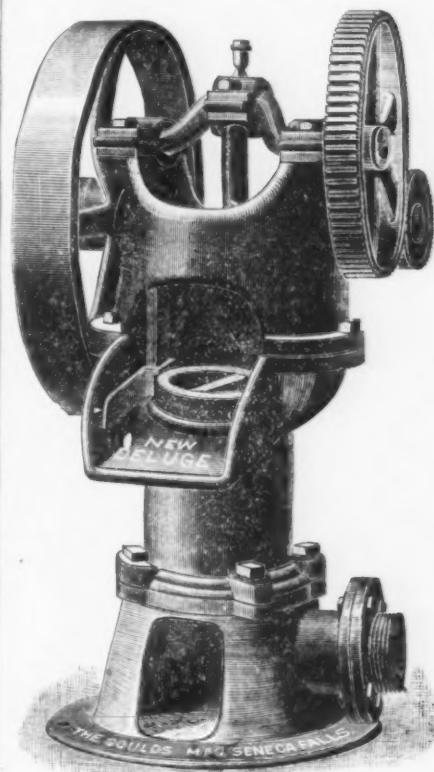


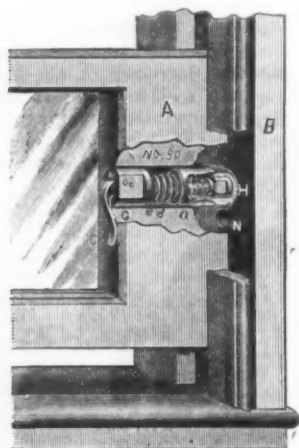
Fig. 3.—Deluge Pump, with Crank, &c., Side Inlet.

discoveries and inventions which may be sent with a view to receiving one or the other of the awards. The conditions of these medals are so very broad that almost every one of an inventive turn of mind has a certain personal interest in them. It is a very simple matter to communicate with the Franklin Institute if any one has a patented device which they think of merit, and we think Mr. Wahl ought to receive a host of communications within a twelvemonth.

King's Improved Sash Support and Bolt.

The accompanying illustration represents this article attached to the sash, a portion of which is removed to show the construction of the Bolt and the method of its operation. The barrel, as will be inferred from the cut, is pressed against the jamb by means of a large spiral spring, D, the object of this pressure being to hold the sash at any desired point and prevent rattling. Through the barrel a bolt passes, which is actuated by a small spiral spring inside the larger spring. This bolt thus acts independently of the barrel, and the office of the spring is to force the bolt into the hole N, and lock the sash when closed. This bolt is connected with and operated by the lever C by means of a rack and pinion movement,

so that it is readily withdrawn when desired. By moving the same lever C upward, the bolt is carried backward to a point where it engages with the barrel, so that by continued lifting on the lever it is drawn in, and its pressure on the jamb



King's Sash Support and Bolt.

relieved, the sash being thus allowed to slide freely. The lever also serves as a lifter in raising the sash. Whenever the lever is dropped, the barrel is again forced against the jamb, so as to hold the sash securely, preventing it from falling. The points made in regard to this article are: That it supports the sash at all points, locking it when closed; that it prevents rattling and does not disfigure the sash; that it is almost entirely out of sight; that it can readily be applied; that it is not liable to get out of order, and is furnished at a moderate price.

Improved Potato Masher, Press and Strainer.

Silver & Co., 56 Warren street, New York, are manufacturing a new upright press for mashing potatoes, pressing fruit, &c. It is represented in the accompanying illustrations, which indicate its general features and the different ways in which it can be used. It will be observed that it is mounted on a support, which can be attached to any table, and in which it is swiveled, permitting it to be used either over a dish on the table or a large



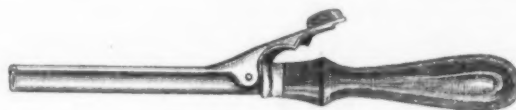
Silver & Co.'s Improved Potato Masher, Fruit Press, &c.

pan or other receptacle off of the table. The cups or strainers are made with openings of different size, according to the use for which they are intended, and they are removable, so as to permit them to be easily cleaned. One fine perforated cup is furnished for jellies, jam, &c., and one coarse perforated cup for potatoes, fruits, &c. The manufacturers allude to the efficiency with which this article does its work and the economy of power connected with its use. Its convenience is referred

to, especially in the fact that it is not necessary to hold it up over the table or dish when in use.

The Cleopatra Hair Curler.

The illustration given below represents a new hair curler which is put on the market by Haff & Walbridge, 76 and 78 Leonard street, New York. The cut gives a general view of the curler, but does not indicate clearly its special feature, which consists in the fact that the iron to which



The Cleopatra Hair Curler.

the handle is attached after being heated is inserted in the tube, thus preventing the soiling of the hair or fingers by contact with the iron. The tube in which it is inserted as well as the arm by which the pressure on the hair is obtained is nickel-plated, thus giving an attractive appearance.

Little Giant Wire Cutter.

This article, which is represented in the accompanying illustration, is made by the Collins-Gibbons Mfg. Company, St. Louis, Mo. This tool is referred to as small but very powerful, the cutting leverage being



Little Giant Wire Cutter.

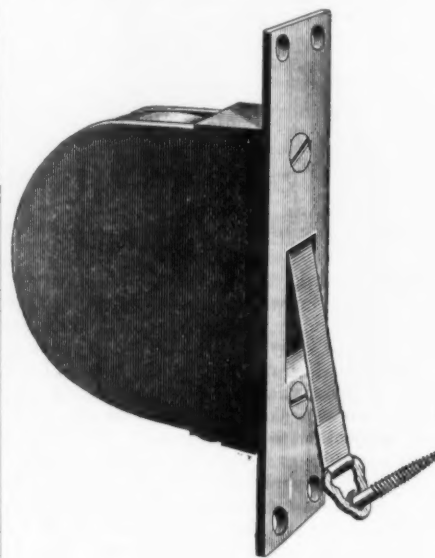
almost directly on the center. The tool is referred to as cutting any size of wire up to $\frac{3}{8}$ inch diameter, just as if it were sawed off. There is a gauge attachment with each cutter.

The Caldwell Sash Balance.

A substitute for the ordinary sash cord and weight, possessing certain features of

end of which is shown in the illustration projecting through the opening in the face-plate. By reference to the engraving it will be noticed that there are two screws indicated in the face-plate of the device. By turning these screws the outer edge of the plate is drawn forcibly against the side of the roller or drum, thereby clamping it, as it were, against the fixed side of the plate and holding it with any desired tension. The adjustment is made before the fixture is applied to the casing of the window and causes the roller to run with greater or less friction as may be found

desirable. A feature of construction to which the maker directs special attention is the manner of attaching the tape to the sash. This is accomplished by setting screws in the edge of the sash sufficiently below the surface not to interfere with the casing and securing the tape by means of the brass loop, clearly shown in the cut. This, the manufacturer claims, admits of the easy removal of the sash from the window for needed repairs or cleaning, it being only necessary to unhook the loop from the screw and allow the tape to



The Caldwell Sash Balance.

wind into the balance. The point at which the loop is attached to the tape is made sufficiently large to prevent that end when released from the window sash from disappearing within the outer casing of the balance. It is claimed for this device that it is applicable not only to window sash, but also to lifting doors, show-cases and similar work. It is so constructed that it may be adjusted to different weights according to the work required of it. While recently introduced to the trade, it has been tested in a number of buildings in Rochester and is being put into others in process of erection. It is well made and is claimed to be durable and economical.

The rivet steel, tests of which were published on page 658 of *The Iron Age*, November 1, was made by the Troy Steel and Iron Company, of Troy, for John Roach.

Japan is supplying herself from England with machinery for the manufacture of cotton and woolen fabrics.

novelty, is being introduced to the building trades by W. H. Caldwell, of Nos. 288 and 290 State street, Rochester, N. Y. A very clear idea of the general appearance of the device, which is known as the Caldwell sash balance, may be gathered from the engraving presented herewith. The balance consists of a casing or outer shell, within which is placed a cast-iron drum carrying a coil spring. Attached to one end of this spring and wound about the drum is a narrow brass tape, the outer

CURRENT HARDWARE PRICES.

NOVEMBER 7, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Caps, Percussion, 1000—

Hicks & Goldmark's

F. L. Waterproof, 1-10's.....	50¢	dis 25¢
E. B. Trimmer Edge, 1-10's.....	55¢	25¢
E. B. Ground Edge, Central Fire, 1-10's.....	70¢	7 1/2¢
Double Waterproof, 1-10's.....	1.10	
Musket Waterproof, 1-10's.....	50¢	
G. D.....	38¢	
G. B.....	30¢	

Union Metallic Cartridge Co.

F. C. Trimmer.....	50¢	dis 25¢
F. L. Ground.....	55¢	25¢
Cent. Fire Group.....	70¢	7 1/2¢
Double Waterproof, 1-10's.....	1.10	
S. B. Genuine Imported.....	45¢	
E. B. E.....	54¢	55¢
Key s D Waterproof, Central Fire.....	1.60	

Cartridges—

Rim Fire Cartridges.....	dis 50¢ & 2¢
Rim Fire Military.....	dis 15¢ & 2¢
Central Fire, Pistol and Rifle.....	dis 15¢ & 2¢
Central Fire, Military & Sporting.....	dis 15¢ & 2¢
Blank Cartridges, except 22 and 32 cal., an additional 10 % over above discounts.	
Blank Cartridges 22 cal.....	dis 17¢, dis 3¢
Blank Cartridges 32 cal.....	dis 35¢, dis 2¢
Primed Shells and Bullets.....	dis 15¢ & 2¢
B. B. Caps, Round Ball.....	dis 17¢, dis 2¢
B. B. Caps, Conical Ball, Swaged.....	dis 20¢, dis 2¢

Primers—

Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells).....	dis 10¢, dis 2¢
All other Primers, all sizes.....	dis 10¢, dis 2¢

Shells—

First quality, 4, 8, 10 and 12 gauge, dis 25¢ & 10¢ & 2¢	
First quality, 14, 16 and 20 gauge (10 list).....	dis 30¢ & 10¢ & 2¢
Star, Club, Rival and 10 gauge, 30 list.....	dis 33¢
Climax Brands, 12 gauge, 30 list.....	dis 10¢ & 2¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge.....	dis 30¢ & 10¢ & 2¢
Selbold's Combination Shot Shells.....	dis 15¢ & 2¢
Brass Shot Shells, 1st quality.....	dis 60¢ & 2¢
Brass Shot Shells, Club, Rival, Climax, dis 65¢ & 2¢	
A. B. & C. Co., I. X. L., 10 & 12 gauge.....	dis 40¢ & 2¢
A. B. & C. Co., "Special," 10 gauge.....	dis 30¢ & 10¢ & 2¢
A. B. & C. Co., "Special," 10 & 12 gauge.....	dis 40¢ & 10¢ & 2¢
Fowler's Patent, 10 & 12 gauge, 100.....	dis 35¢

Shells Loaded—

List No. 19, 1887.....	dis 20¢ & 10¢
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Wads—

U. M. C. & W. R. A.—B. E., 11 up.....	dis 20¢
U. M. C. & W. R. A.—B. E., 9 & 10.....	dis 20¢
U. M. C. & W. R. A.—B. E., 7 & 8.....	dis 20¢
U. M. C. & W. R. A.—P. E., 11 up.....	dis 20¢
U. M. C. & W. R. A.—P. E., 9 & 10.....	dis 20¢
U. M. C. & W. R. A.—P. E., 7 & 8.....	dis 20¢

Amvils—

Amvil, Eagle Amvil.....	dis 10¢, dis 20¢ & 30¢
Peter Wright's.....	dis 20¢
Armstrong's Mouse Hole.....	dis 20¢
Armstrong's Mouse Hole, Extra.....	dis 20¢
Trenton.....	dis 20¢
Wilkinson's.....	dis 20¢
J. & Riley Carr. Patent Solid.....	dis 20¢

Amvil Vise and Drill—

Millers Falls Co.....	dis 18.00, dis 30¢
Cheney Amvil and Vise.....	dis 20¢
Allen Combined Amvil and Vise.....	dis 20¢
Moore & Barnes Mfg. Co.....	dis 33¢

Apple Parers.

Advance.....	dis 44.75
Antrim Combination.....	dis 5.50
Baldwin.....	dis 5.25
Champion.....	dis 7.25
Eureka, 1888.....	dis 17.00
Family Bay State.....	dis 12.00
Gem.....	dis 5.50
Gold Medal.....	dis 4.00
Hudson's New '88.....	dis 3.75
Ideal.....	dis 4.75
Improved Bay State.....	dis 30.00
Little Star.....	dis 5.00
Monarch.....	dis 13.50
New Lightning.....	dis 4.50
Orion.....	dis 4.00
Penn.....	dis 4.00
Perfection.....	dis 4.00
Pomona.....	dis 4.00
Rocking Table.....	dis 6.00
Turntable.....	dis 4.50
Victor.....	dis 13.50
Waverly.....	dis 4.50
White Mountain.....	dis 4.50
72.....	dis 4.25
76.....	dis 5.75
78.....	dis 6.50

Angers and Bits.

Douglas Mfg. Co.....	dis 70¢
Wm. A. Ives & Co.....	dis 70¢
Humphreysville Mfg. Co.....	dis 70¢
French, Swift & Co. (F. H. Beecher).....	dis 60¢ & 10¢ & 10¢
New Haven Copper Co.....	dis 60¢ & 10¢ & 10¢
Cook's, Douglas Mfg. Co.....	dis 60¢ & 10¢ & 10¢
Ives' Circular Lip.....	dis 60¢ & 10¢ & 10¢
Patent Solid Head.....	dis 60¢
C. E. Jennings & Co., No. 10, extension lip.....	dis 60¢
C. E. Jennings & Co., No. 30.....	dis 60¢
C. E. Jennings & Co., Auger Bits, in fancy boxes, set, 32¢ quarters, No. 5, 8, 10, 30, 32.....	dis 20¢
Lewis' Patent Single Twist.....	dis 25¢
Russell Jennings' Augers and Bits.....	dis 60¢ & 10¢ & 10¢
Imitation Jennings Bits (new list).....	dis 20¢
Pugh's Black.....	dis 50¢ & 10¢ & 10¢
Car Bits.....	dis 15¢ & 10¢
L'Hommedieu Car Bits.....	dis 10¢
Forstner Pat. Auger Bits.....	dis 10¢

Follow Augers—

Ives.....	dis 25¢ & 10¢
French, Swift & Co.....	dis 25¢ & 10¢
Douglas.....	dis 40¢ & 10¢
Bonney's Adjustable.....	dis 20¢ & 10¢
Stearns.....	dis 20¢ & 10¢
Ives' Expansive, each \$4.50.....	dis 20¢
Universal Expansive, each \$4.50.....	dis 20¢
Wood's.....	dis 25¢ & 10¢

Expansive Bits—

Clark's small; 18; large, 28.....	dis 35¢ & 55¢
Ives' No. 4, per doz., 800.....	dis 35¢ & 40¢
Swan's, No. 1, 22; No. 2, 22.....	dis 35¢
Stearns' No. 2, 18.....	dis 20¢
Common.....	dis 25¢ & 35¢
Diamond.....	dis 1.10, dis 25¢ & 10¢
Double Cut, Shepardson's.....	dis 25¢ & 25¢
Double Cut, Ct. Valley Mfg. Co.....	dis 30¢ & 10¢
Double Cut, Hartwell's, 7 gro.....	dis 35¢
Double Cut, Douglas.....	dis 40¢ & 10¢
Double Cut, Ives.....	dis 60¢ & 60¢

Bit Stock Drills—

Morse Twist Drills.....	dis 50¢ & 10¢ & 5¢
Barrel.....	dis 50¢ & 10¢ & 5¢
Cleveland.....	dis 50¢ & 10¢ & 5¢
Syracuse, for metal.....	dis 50¢ & 10¢ & 5¢
Syracuse, for wood (wood list).....	dis 30¢ & 30¢ & 5¢
Williams' or Holt's, for metal.....	dis 50¢ & 10¢ & 5¢
Williams' or Holt's, for wood.....	dis 40¢ & 10¢

Saws, Augers and Bits—

Watrous's.....	dis 15¢ & 10¢
Snell's.....	dis 15¢ & 10¢
Snell's Ship Auger Pat'n Car Bits.....	dis 15¢ & 10¢
Swing, Brass Ferrule.....	dis 35¢ & 50¢
Patent Sewing, Short.....	dis 1.00 & 1.20
Patent Sewing, Long.....	dis 1.20 & 1.40
Patent Peg, Plain Top.....	dis 1.00 & 1.20
Patent Peg, Leather Top.....	dis 1.20 & 1.40

Awls, Brad Sets, &c.

Awls, Sewing, Common.....	dis 1.70—dis 35¢
Awls, Shouldered Peg.....	dis 35¢ & 40¢ & 10¢
Awls, Patent Peg.....	dis 35¢ & 40¢ & 10¢
Awls, Shouldered Brad.....	dis 35¢ & 40¢ & 10¢
Awls, Handled Brad.....	dis 35¢ & 40¢ & 10¢
Awls, Handled Scratch.....	dis 35¢ & 40¢ & 10¢
Awls, Socket Scratch.....	dis 35¢ & 40¢ & 10¢

Awls and Tool Sets.

Allen's Sets, Awls & Tools, No. 20.....	dis 10¢ & 10¢
Allen's Ad. Tool Hds., Nos. 1, 12; 2, 12; 3, 12; 4, 12.....	dis 25¢ & 25¢
Allen's Falls Ad. Tool Hds., Nos. 1, 12; 2, 12; 3, 12; 4, 12.....	dis 25¢ & 25¢
Allen's Combination Haft.....	dis 25¢ & 25¢
Allen's Ad. Tool Hds., No. 43, 11.50.....	dis 70¢ & 10¢ & 5¢
Allen's Ad. Tool Hds., No. 1, 7.50.....	dis 70¢ & 10¢ & 5¢
Allen's Ad. Tool Hds., No. 2, 4.00.....	dis 30¢ & 10¢ & 5¢
Allen's Ad. Tool Hds., No. 3, 4.50.....	dis 30¢ & 10¢ & 5¢

Axes.

Makers' and Special Brands—	
First quality.....	dis 20¢, dis 30¢, dis 50¢
Others.....	dis 20¢, dis 30¢, dis 50¢

Axle Grease.

Fraser's, in bulk.....	dis 4¢, dis 4¢, dis 4¢
Fraser's, in boxes.....	dis 4¢, dis 4¢, dis 4¢
Dixon's Everlasting, in bxs., 1 lb.....	dis 1.20, dis 1.20, dis 1.20
Dixon's Everlasting, 10 lb pails, each.....	dis 10.00, dis 10.00, dis 10.00
Lower grades, special brands.....	dis 5¢, dis 5¢, dis 5¢

Axles.—No. 1, 4¢ & 4¢; No. 2, 5¢ & 5¢.

No. 7 to 18.....	dis 50¢ & 55¢
No. 19 to 22.....	dis 60¢ & 10¢ & 10¢
National Wrought Steel Tubular Self-Oiling Standard Farm (1 to 5) and Special Farm (A1 to A5) Over 10 sets.....	dis 35¢
Over 10 sets.....	dis 35¢
XX Strong Exp. (6 to 9), and XX Strong Truck (10 to 16) Over 10 sets.....	dis 10¢ & 10¢

Gas Holders.

Spurgie's Pat., 7 doz 118.....	dis 60¢
Spurgie's Pat., 7 doz 118.....	dis 60¢
Common 24.....	dis 1.50—dis 50¢
Chadillon's Spring Balances.....	dis 50¢
Chadillon's Circular Spring Balances.....	dis 60¢

Belts.

Light Brass.....	dis 70¢ & 10¢
Extra Heavy.....	dis 60¢ & 10¢
White Metal.....	dis 60¢ & 10¢
Silver Metal.....	dis 35¢ & 10¢
Globe (Cone's Patent).....	dis 35¢ & 10¢

Doors.

Gong, Abbe's.....	dis 33¢ & 10¢
Gong, Yankee.....	dis 45¢ & 10¢
Gong, Barton's.....	dis 40¢ & 10¢ & 50¢
Gong, Taylor's.....	dis 25¢ & 10¢
Gong, Brooks.....	dis 50¢ & 10¢
Gong, Cone's.....	dis 10¢
Gong, Connel's.....	dis 30¢ & 10¢
Gong, Sargent's.....	dis 60¢ & 10¢
Gong, Taylor's Bronzed or Plated.....	dis 25¢ & 10¢
Gong, R. & W. Co's.....	dis 50¢ & 10¢
Gong, Pull Brook's.....	dis 25¢ & 10¢
Gong, Pull Western.....	dis 25¢ & 10¢

Common Wrought.

Common Wrought.....	dis 60¢ & 10¢
Western, Sargent's list.....	dis 70¢ & 10¢
Kentucky, Sargent's list.....	dis 70¢ & 10¢
Dodge, Genuine Kentucky, new list.....	dis 70¢ & 10¢
Texas Star.....	dis 50¢ & 10¢ & 10¢
Call.....	dis 40¢ & 10¢
Garm Sells.....	dis 35¢ & 10¢
Steel and Iron Churn and School Bell.....	dis 40¢
Bellows.....	dis 60¢ & 10¢ & 50¢
Molders.....	dis 40¢ & 10¢
Hand Bellows.....	dis 40¢ & 10¢

Belting, Rubber.

Common Standard.....	dis 70¢ & 10¢
Standard.....	dis 70¢ & 10¢
N. Y. R. & Co. Standard.....	dis 60¢ & 10¢
N. Y. R. & Co. Extra Standard.....	dis 50¢ & 10¢

Bench Stops.

Worrell's.....	dis 50¢ & 10¢
Hotchkiss's.....	dis 50¢ & 10¢
Weston's, per doz No. 1, 10; No. 2, 10.....	dis 25¢ & 10¢
Medall's.....	dis 30¢ & 10¢

Bits.—Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.

Bit Holders.

Extension, Barber's.....	dis 15.00—dis 40¢ & 10¢
Extension, Ives.....	dis 20.00—dis 60¢ & 10¢
Diagonal.....	dis 24.00—dis 40¢
Angular.....	dis 24.00—dis 40¢

Blind Fasteners.

Domestic.....	dis 30¢ & 10¢
Excelsior.....	dis 10.00—dis 50¢ & 10¢
Washburn's Self-Locking.....	dis 20¢ & 10¢

Blind Fasteners.

Mackrell's.....	dis 20¢ & 10¢
Van Sand's Screw Pattern.....	dis 15¢ & 10¢
Van Sand's Old Pattern.....	dis 15¢ & 10¢
Washburn's Old Pattern.....	dis 15¢ & 10¢
Merriman's.....	dis 15¢ & 10¢
Austin & Eddy No. 2008.....	dis 15¢ & 10¢
Security Gravity.....	dis 15¢ & 10¢

Blind Staples.

Barbed, 1/2 in. and larger.....	dis 7¢ & 10¢
Barbed, 1/2 in.....	dis 8¢ & 10¢

Blocks.

Cleveland Block Co., Mal. Iron.....	dis 50¢
Novelty Tackle Blocks, Mal. Iron.....	dis 50¢

Bolts.

Door and Shutter.....	dis 70¢ & 10¢
Cast Iron Shutter Bolts.....	dis 70¢ & 10¢
Cast Iron Chain (Sargent's list).....	dis 65¢ & 10¢
Ives' Patent Door Bolts.....	dis 60¢
Wrought Barrel.....	dis 70¢ & 10¢
Wrought Square.....	dis 70¢ & 10¢
Wrought all Iron Stanley's list.....	dis 60¢ & 10¢
Wrought Shutter, Brass Knob, Stanley's list.....	dis 60¢ & 10¢
Wrought Shutter, Sargent's list.....	dis 60¢ & 10¢
Wrought Sunk Flush, Sargent's list.....	dis 55¢ & 10¢
Wrought Sunk Flush, Stanley's list.....	dis 50¢ & 10¢
Wrought R. K. Flush, Com'n Stanley's list.....	dis 55¢ & 10¢

Carriage.

Com. list June 10, '84.....	dis 75¢ & 10¢
Genuine Eagle, list Oct. '84.....	dis 75¢ & 10¢
Phila. pattern, list Oct. 7, '84.....	dis 75¢ & 10¢
R. B. & W. old list.....	dis 70¢

Common.

Common, list Feb. 28, 1888.....	dis 70¢
P. C. B. & N. Co., Empire, list Feb. 28, 1888.....	dis 70¢
P. C. B. & N. Co., Philadel., list Oct. '84.....	dis 82¢
P. C. B. & N. Co., Keystone, Phil. list Oct. '84.....	dis 80¢
P. C. B. & N. Co., Norway, Phil. list Oct. '84.....	dis 75¢ & 10¢
Am. S. Co., Norway, Phil. list Oct. '84.....	dis 75¢ & 10¢
Am. S. Co., Eagle, Phil. list Oct. '84.....	dis 80¢
Am. S. Co., Philadel., list Oct. '84.....	dis 82¢
Am. S. Co., Ray State, list Feb. 28, '85.....	dis 70¢
R. B. & W., Philadel., list Oct. 16, 1884.....	dis 82¢
R. & E. Mfg. Co.....	dis 70¢

Stove and Plow.

Stove.....	dis 62¢
Plow.....	dis 60¢

Wrought (Steel)—	
Fast Joint, Narrow	dis 70x10
Fast Joint, Lt. Narrow	dis 70x10
Fast Joint, Broad	dis 70x10
Loose Joint, Broad	dis 70x10
Table Butte, Back Flaps, &c.	dis 70x10
Inside Blind, Regular	dis 70x10
Inside Blind, Light	dis 70x10
Loose Pin	dis 70x10
Bronzed Wrought Butte	dis 40x10 @ 40x10 & 50x10

Calipers.—See Compasses.

Calks, Toe	
Gautier	dis 25
Dewicks	dis 25
Can Openers.	
Messenger's Comet	dis 25
American	dis 25
Duplex	dis 25
Lyman's	dis 25
No. 4, French	dis 25
No. 5, Iron handle	dis 25
Eureka	dis 25
Sardine Scissors	dis 25
Star	dis 25
Sprague, No. 1	dis 25
World's Best	dis 25
No. 3	dis 25
Universal	dis 25
Domestic	dis 25
Champion	dis 25

Cards.

Horse and Curry	dis 10x10 @ 10x10 & 10x10
Cotton	dis 10x10 @ 10x10 & 10x10
Wool	dis 10x10 @ 10x10 & 10x10

Carpet Stretchers.

Cast Steel, Polished	dis 12.25
Cast Iron, Steel Points	dis 11.75
Socket	dis 25 @ 25x10
Bullard's	dis 25 @ 25x10

Carpet Sweepers.

Bissell No. 5	dis 17.00
Bissell No. 7 New Drop Pan	dis 19.00
Bissell Grand	dis 23.00
Grand Rapids	dis 24.00
Crown Jewel	dis 24.00
No. 1, \$18; No. 2, \$19; No. 3, \$20	
Magie	dis 17.00
Jewel	dis 17.00
Improved Parlor Queen, Nickel Trimming	dis 17.00
Improved Parlor Queen, Japanese Trimming	dis 17.00
Excelsior	dis 21.00
Garland	dis 18.00
Parlor Queen	dis 24.00
Housewife's Delight	dis 15.00
Queen	dis 16.00
Queen, with band	dis 18.00
King	dis 18.00
Weed Improved	dis 18.00
Hub	dis 18.00
Cog Wheel	dis 16.00

Cartridges.—See Ammunition.

Casters.

Red	dis 55 @ 55x5
Shallow Socket	dis 55 @ 55x5
Deep Socket	dis 55 @ 55x5
Yale Casters, list May, 1884	dis 55 @ 55x5
Yale, Gem	dis 55 @ 55x5
Martin's Patent (Phoenix)	dis 55 @ 55x5
Payson's Anti-friction	dis 55 @ 55x5
"Giant" Truck Casters	dis 55 @ 55x5
Stationary Truck Casters	dis 55 @ 55x5

Cattle Loaders.

Humason, Beckley & Co.'s	dis 70
Sargent's	dis 65 @ 65x10
Hutchins	dis 30
Peck Stow & W. Co.	dis 50x10

Chain.

Trace, 6-10-2, exact sizes, pair, \$1.03	dis 50x10
Trace, 6-10-3, exact sizes, pair, .92	dis 50x10
Trace, 7-10-2, exact sizes, pair, 1.11	dis 50x10

NOTE.—Traces, "Regular" sizes 3c net & pair less than exact.

Log, Fifth, Strengthened, and other fancy Chains, list Nov. 1, 1884

American Coil 3-16 5-16 7-16 9-16 11-16 13-16 15-16 17-16 19-16 21-16 23-16 25-16 27-16 29-16 31-16 33-16 35-16 37-16 39-16 41-16 43-16 45-16 47-16 49-16 51-16 53-16 55-16 57-16 59-16 61-16 63-16 65-16 67-16 69-16 71-16 73-16 75-16 77-16 79-16 81-16 83-16 85-16 87-16 89-16 91-16 93-16 95-16 97-16 99-16 101-16 103-16 105-16 107-16 109-16 111-16 113-16 115-16 117-16 119-16 121-16 123-16 125-16 127-16 129-16 131-16 133-16 135-16 137-16 139-16 141-16 143-16 145-16 147-16 149-16 151-16 153-16 155-16 157-16 159-16 161-16 163-16 165-16 167-16 169-16 171-16 173-16 175-16 177-16 179-16 181-16 183-16 185-16 187-16 189-16 191-16 193-16 195-16 197-16 199-16 201-16 203-16 205-16 207-16 209-16 211-16 213-16 215-16 217-16 219-16 221-16 223-16 225-16 227-16 229-16 231-16 233-16 235-16 237-16 239-16 241-16 243-16 245-16 247-16 249-16 251-16 253-16 255-16 257-16 259-16 261-16 263-16 265-16 267-16 269-16 271-16 273-16 275-16 277-16 279-16 281-16 283-16 285-16 287-16 289-16 291-16 293-16 295-16 297-16 299-16 301-16 303-16 305-16 307-16 309-16 311-16 313-16 315-16 317-16 319-16 321-16 323-16 325-16 327-16 329-16 331-16 333-16 335-16 337-16 339-16 341-16 343-16 345-16 347-16 349-16 351-16 353-16 355-16 357-16 359-16 361-16 363-16 365-16 367-16 369-16 371-16 373-16 375-16 377-16 379-16 381-16 383-16 385-16 387-16 389-16 391-16 393-16 395-16 397-16 399-16 401-16 403-16 405-16 407-16 409-16 411-16 413-16 415-16 417-16 419-16 421-16 423-16 425-16 427-16 429-16 431-16 433-16 435-16 437-16 439-16 441-16 443-16 445-16 447-16 449-16 451-16 453-16 455-16 457-16 459-16 461-16 463-16 465-16 467-16 469-16 471-16 473-16 475-16 477-16 479-16 481-16 483-16 485-16 487-16 489-16 491-16 493-16 495-16 497-16 499-16 501-16 503-16 505-16 507-16 509-16 511-16 513-16 515-16 517-16 519-16 521-16 523-16 525-16 527-16 529-16 531-16 533-16 535-16 537-16 539-16 541-16 543-16 545-16 547-16 549-16 551-16 553-16 555-16 557-16 559-16 561-16 563-16 565-16 567-16 569-16 571-16 573-16 575-16 577-16 579-16 581-16 583-16 585-16 587-16 589-16 591-16 593-16 595-16 597-16 599-16 601-16 603-16 605-16 607-16 609-16 611-16 613-16 615-16 617-16 619-16 621-16 623-16 625-16 627-16 629-16 631-16 633-16 635-16 637-16 639-16 641-16 643-16 645-16 647-16 649-16 651-16 653-16 655-16 657-16 659-16 661-16 663-16 665-16 667-16 669-16 671-16 673-16 675-16 677-16 679-16 681-16 683-16 685-16 687-16 689-16 691-16 693-16 695-16 697-16 699-16 701-16 703-16 705-16 707-16 709-16 711-16 713-16 715-16 717-16 719-16 721-16 723-16 725-16 727-16 729-16 731-16 733-16 735-16 737-16 739-16 741-16 743-16 745-16 747-16 749-16 751-16 753-16 755-16 757-16 759-16 761-16 763-16 765-16 767-16 769-16 771-16 773-16 775-16 777-16 779-16 781-16 783-16 785-16 787-16 789-16 791-16 793-16 795-16 797-16 799-16 801-16 803-16 805-16 807-16 809-16 811-16 813-16 815-16 817-16 819-16 821-16 823-16 825-16 827-16 829-16 831-16 833-16 835-16 837-16 839-16 841-16 843-16 845-16 847-16 849-16 851-16 853-16 855-16 857-16 859-16 861-16 863-16 865-16 867-16 869-16 871-16 873-16 875-16 877-16 879-16 881-16 883-16 885-16 887-16 889-16 891-16 893-16 895-16 897-16 899-16 901-16 903-16 905-16 907-16 909-16 911-16 913-16 915-16 917-16 919-16 921-16 923-16 925-16 927-16 929-16 931-16 933-16 935-16 937-16 939-16 941-16 943-16 945-16 947-16 949-16 951-16 953-16 955-16 957-16 959-16 961-16 963-16 965-16 967-16 969-16 971-16 973-16 975-16 977-16 979-16 981-16 983-16 985-16 987-16 989-16 991-16 993-16 995-16 997-16 999-16 1001-16 1003-16 1005-16 1007-16 1009-16 1011-16 1013-16 1015-16 1017-16 1019-16 1021-16 1023-16 1025-16 1027-16 1029-16 1031-16 1033-16 1035-16 1037-16 1039-16 1041-16 1043-16 1045-16 1047-16 1049-16 1051-16 1053-16 1055-16 1057-16 1059-16 1061-16 1063-16 1065-16 1067-16 1069-16 1071-16 1073-16 1075-16 1077-16 1079-16 1081-16 1083-16 1085-16 1087-16 1089-16 1091-16 1093-16 1095-16 1097-16 1099-16 1101-16 1103-16 1105-16 1107-16 1109-16 1111-16 1113-16 1115-16 1117-16 1119-16 1121-16 1123-16 1125-16 1127-16 1129-16 1131-16 1133-16 1135-16 1137-16 1139-16 1141-16 1143-16 1145-16 1147-16 1149-16 1151-16 1153-16 1155-16 1157-16 1159-16 1161-16 1163-16 1165-16 1167-16 1169-16 1171-16 1173-16 1175-16 1177-16 1179-16 1181-16 1183-16 1185-16 1187-16 1189-16 1191-16 1193-16 1195-16 1197-16 1199-16 1201-16 1203-16 1205-16 1207-16 1209-16 1211-16 1213-16 1215-16 1217-16 1219-16 1221-16 1223-16 1225-16 1227-16 1229-16 1231-16 1233-16 1235-16 1237-16 1239-16 1241-16 1243-16 1245-16 1247-16 1249-16 1251-16 1253-16 1255-16 1257-16 1259-16 1261-16 1263-16 1265-16 1267-16 1269-16 1271-16 1273-16 1275-16 1277-16 1279-16 1281-16 1283-16 1285-16 1287-16 1289-16 1291-16 1293-16 1295-16 1297-16 1299-16 1301-16 1303-16 1305-16 1307-16 1309-16 1311-16 1313-16 1315-16 1317-16 1319-16 1321-16 1323-16 1325-16 1327-16 1329-16 1331-16 1333-16 1335-16 1337-16 1339-16 1341-16 1343-16 1345-16 1347-16 1349-16 1351-16 1353-16 1355-16 1357-16 1359-16 1361-16 1363-16 1365-16 1367-16 1369-16 1371-16 1373-16 1375-16 1377-16 1379-16 1381-16 1383-16 1385-16 1387-16 1389-16 1391-16 1393-16 1395-16 1397-16 1399-16 1401-16 1403-16 1405-16 1407-16 1409-16 1411-16 1413-16 1415-16 1417-16 1419-16 1421-16 1423-16 1425-16 1427-16 1429-16 1431-16 1433-16 1435-16 1437-16 1439-16 1441-16 1443-16 1445-16 1447-16 1449-16 1451-16 1453-16 1455-16 1457-16 1459-16 1461-16 1463-16 1465-16 1467-16 1469-16 1471-16 1473-16 1475-16 1477-16 1479-16 1481-16 1483-16 1485-16 1487-16 1489-16 1491-16 1493-16 1495-16 1497-16 1499-16 1501-16 1503-16 1505-16 1507-16 1509-16 1511-16 1513-16 1515-16 1517-16 1519-16 1521-16 1523-16 1525-16 1527-16 1529-16 1531-16 1533-16 1535-16 1537-16 1539-16 1541-16 1543-16 1545-16 1547-16 1549-16 1551-16 1553-16 1555-16 1557-16 1559-16 1561-16 1563-16 1565-16 1567-16 1569-16 1571-16 1573-16 1575-16 1577-16 1579-16 1581-16 1583-16 1585-16 1587-16 1589-16 1591-16 1593-16 1595-16 1597-16 1599-16 1601-16 1603-16 1605-16 1607-16 1609-16 1611-16 1613-16 1615-16 1617-16 1619-16 1621-16 1623-16 1625-16 1627-16 1629-16 1631-16 1633-16 1635-16 1637-16 1639-16 1641-16 1643-16 1645-16 1647-16 1649-16 1651-16 1653-16 1655-16 1657-16 1659-16 1661-16 1663-16 1665-16 1667-16 1669-16 1671-16 1673-16 1675-16 1677-16 1679-16 1681-16 1683-16 1685-16 1687-16 1689-16 1691-16 1693-16 1695-16 1697-16 1699-16 1701-16 1703-16 1705-16 1707-16 1709-16 1711-16 1713-16 1715-16 1717-16 1719-16 1721-16 1723-16 1725-16 1727-16 1729-16 1731-16 1733-16 1735-16 1737-16 1739-16 1741-16 1743-16 1745-16 1747-16 1749-16 1751-16 1753-16 1755-16 1757-16 1759-16 1761-16 1763-16 1765-16 1767-16 1769-16 1771-16 1773-16 1775-16 1777-16 1779-16 1781-16 1783-16 1785-16 1787-16 1789-16 1791-16 1793-16 1795-16 1797-16 1799-16 1801-16 1803-16 1805-16 1807-16 1809-16 1811-16 1813-16 1815-16 1817-16 1819-16 1821-16 1823-16 1825-16 1827-16 1829-16 1831-16 1833-16 1835-16 1837-16 1839-16 1841-16 1843-16 1845-16 1847-16 1849-16 1851-16 1853-16 1855-16 1857-16 1859-16 1861-16 1863-16 1865-16 1867-16 1869-16 1871-16 1873-16 1875-16 1877-16 1879-16 1881-16 1883-16 1885-16 1887-16 1889-16 1891-16 1893-16 1895-16 1897-16 1899-16 1901-16 1903-16 1905-16 1907-16 1909-16 1911-16 1913-16 1915-16 1917-16 1919-16 1921-16 1923-16 1925-16 1927-16 1929-16 1931-16 1933-16 1935-16 1937-16 1939-16 1941-16 1943-16 1945-16 1947-16 1949-16 1951-16 1953-16 1955-16 1957-16 1959-16 1961-16 1963-16 1965-16 1967-16 1969-16 1971-16 1973-16 1975-16 1977-16 1979-16 1981-16 1983-16 1985-16 1987-16 1989-16 1991-16 1993-16 1995-16 1997-16 1999-16 2001-16 2003-16 2005-16 2007-16 2009-16 2011-16 2013-16 2015-16 2017-16 2019-16 2021-16 2023-16 2025-16 2027-16 2029-16 2031-16 2033-16 2035-16 2037-16 2039-16 2041-16 2043-16 2045-16 2047-16 2049-16 2051-16 2053-16 2055-16 2057-16 2059-16 2061-16 2063-16 2065-16 2067-16 2069-16 2071-16 2073-16 2075-16 2077-16 2079-16 2081-16 2083-16 2085-16 2087-16 2089-16 2091-16 2093-16 2095-16 2097-16 2099-16 2101-16 2103-16 2105-16 2107-16 2109-16 2111-16 2113-16 2115-16 2117-16 2119-16 2121-16 2123-16 2125-16 2127-16 2129-16 2131-16 2133-16 2135-16 2137-16 2139-16 2141-16 2143-16 2145-16 2147-16 2149-16 2151-16 2153-16 2155-16 2157-16 2159-16 2161-16 2163-16 2165-16 2167-16 2169-16 2171-16 2173-16 2175-16 2177-16 2179-16 2181-16 2183-16 2185-16 2187-16 2189-16 2191-16 2193-16 2195-16 2197-16 2199-16 2201-16 2203-16 2205-16 2207-16 2209-16 2211-16 2213-16 2215-16 2217-16 2219-16 2221-16 2223-16 2225-16 2227-16 2229-16 2231-16 2233-16 2235-16 2237-16 2239-16 2241-16 2243-16 2245-16 2247-16 2249-16 2251-16 2253-16 2255-16 2257-16 2259-16 2261-16 2263-16 2265-16 2267-16 2269-16 2271-16 2273-16 2275-16 2277-16 2279-16 2281-16 2283-16 2285-16 2287-16 2289-16 2291-16 2293-16 2295-16 2297-16 2299-16 2301-16 2303-16 2305-16 2307-16 2309-16 2311-16 2313-16 2315-16 2317-16 2319-16 2321-16 2323-16 2325-16 2327-16 2329-16 2331-16 2333-16 2335-16 2337-16 2339-16 2341-16 2343-16 2345-16 2347-16 2349-16 2351-16 2353-16 2355-16 2357-16 2359-16 2361-16 2363-16 2365-16 2367-16 2369-16 2371-16 2373-16 2375-16 2377-16 2379-16 2381-16 2383-16 2385-16 2387-16 2389-16 2391-16 2393-16 2395-16 2397-16 2399-16 2401-16 2403-16 2405-16 2407-16 2409-16 2411-16 2413-16 2415-16 2417-16 2419-16 2421-16 2423-16 2425-16 2427-16 2429-16 2431-16 2433-16 2435-16 2437-16 2439-16 2441-16 2443-16 2445-16 2447-16 2449-16 2451-16 2453-16 2455-16 2457-16 2459-16 2461-16 2463-16 2465-16 2467-16 2469-16 2471-16 2473-16 2475-16 2477-16 2479-16 2481-16 2483-16 2485-16 2487-16 2489-16 2491-16 2493-16 2495-16 2497-16 2499-16 2501-16 2503-16 2505-16 2507-16 2509-16 2511-16 2513-16 2515-16 2517-16 2519-16 2521-16

Hickory Firmer Chisel, assorted...... $\frac{1}{2}$ gross 4.50
Hickory Firmer Chisel, large...... $\frac{1}{2}$ gross 5.00
Apple Firmer Chisel, assorted...... $\frac{1}{2}$ gross 4.00
Apple Firmer Chisel, large...... $\frac{1}{2}$ gross 4.50
Socket Firmer Chisel, assorted...... $\frac{1}{2}$ gross 3.00
Socket Framing Chisel, assorted...... $\frac{1}{2}$ gross 5.00
J. B. Smith Co.'s Pat. File...... $\frac{1}{2}$ doz 50
File, assorted...... $\frac{1}{2}$ gross 2.75
Auger, assorted...... $\frac{1}{2}$ gross 5.00
Auger, large...... $\frac{1}{2}$ gross 5.00
Patent Auger, Douglas's...... $\frac{1}{2}$ set $\frac{1}{2}$ doz net
Patent Auger, Swann's...... $\frac{1}{2}$ set $\frac{1}{2}$ doz net
Hoe, Rake, Shovel, &c...... $\frac{1}{2}$ doz 50
Cross Cut Saw Handles...... $\frac{1}{2}$ gross 5.00
Atkins' No. 1 Loop, pair, 80# No. 8, 22# No. 2
and No. 4 Reversible, 22#...... $\frac{1}{2}$ doz 50
Boynston's Loop Saw Handles...... $\frac{1}{2}$ doz 50
Champion...... $\frac{1}{2}$ doz 50

Hangers.
Barn Door, old patterns...... $\frac{1}{2}$ doz 50
Barn Door, New England...... $\frac{1}{2}$ doz 50
Samson Steel Anti-Friction...... $\frac{1}{2}$ doz 50
Orleans Steel...... $\frac{1}{2}$ doz 50
Hamilton Wrought Wood Track...... $\frac{1}{2}$ doz 50
U. S. Steel Track...... $\frac{1}{2}$ doz 50
Champion...... $\frac{1}{2}$ doz 50
Rider and Wooster, Medina Mfg. Co.'s list...... $\frac{1}{2}$ doz 50
Climax Anti-Friction...... $\frac{1}{2}$ doz 50
Climax Steel Anti-Friction...... $\frac{1}{2}$ doz 50
Zenith for Wood Track...... $\frac{1}{2}$ doz 50
Reed Steel Arm...... $\frac{1}{2}$ doz 50
Challenge, Hard Draw...... $\frac{1}{2}$ doz 50
Sterling Improved (Anti-Friction)...... $\frac{1}{2}$ doz 50
Victor, No. 1, 115; No. 2, 116.50; No. 3, 118...... $\frac{1}{2}$ doz 50
Cheritree...... $\frac{1}{2}$ doz 50
Kidder's...... $\frac{1}{2}$ doz 50
The "H" Horse...... $\frac{1}{2}$ doz 50
Best Anti-Friction...... $\frac{1}{2}$ doz 50
Best Wood Track...... $\frac{1}{2}$ doz 50
Terry's Patent...... $\frac{1}{2}$ doz 50
Cronk's Patent...... $\frac{1}{2}$ doz 50
Wood Track...... $\frac{1}{2}$ doz 50
Castor Steel Anti-Friction...... $\frac{1}{2}$ doz 50
Architect...... $\frac{1}{2}$ doz 50
Billips...... $\frac{1}{2}$ doz 50
Felt...... $\frac{1}{2}$ doz 50
Richards...... $\frac{1}{2}$ doz 50
Lane's Steel Anti-Friction...... $\frac{1}{2}$ doz 50
The Best Bearing Door Hanger...... $\frac{1}{2}$ doz 50
Warner's Patent...... $\frac{1}{2}$ doz 50
Stearns' Anti-Friction...... $\frac{1}{2}$ doz 50
Stearns' Challenge...... $\frac{1}{2}$ doz 50
Pauline...... $\frac{1}{2}$ doz 50
American...... $\frac{1}{2}$ doz 50
Rider and Wooster, No. 1, 125; No. 2, 75...... $\frac{1}{2}$ doz 50
Paragon, Nos. 2 and 3...... $\frac{1}{2}$ doz 50
Paragon, Nos. 5, 54, 7 and 8...... $\frac{1}{2}$ doz 50
Prescent...... $\frac{1}{2}$ doz 50
Nickel, Cast Iron...... $\frac{1}{2}$ doz 50
Nickel, Malleable Iron and Steel...... $\frac{1}{2}$ doz 50
Scranton Anti-Friction Sing's Strap...... $\frac{1}{2}$ doz 50
Wagon on Anti-Friction Double Strap...... $\frac{1}{2}$ doz 50
Universal Anti-Friction...... $\frac{1}{2}$ doz 50
West, 4 in. wheel, 115; 5 in. wheel, 121...... $\frac{1}{2}$ doz 50
Star...... $\frac{1}{2}$ doz 50
May...... $\frac{1}{2}$ doz 50

Harness Muffs.—See Snaps.
Hatchets.—List Jan. 1, 1886.
Isaiah Blood...... $\frac{1}{2}$ doz 35
Hunt's Shingling Lath and Claw...... $\frac{1}{2}$ doz 40
Hunt's Broad...... $\frac{1}{2}$ doz 40
Buffalo Hammer Co...... $\frac{1}{2}$ doz 40
Burd's...... $\frac{1}{2}$ doz 40
Fayette R. Plumb...... $\frac{1}{2}$ doz 40
H. Mann, Jr., & Co...... $\frac{1}{2}$ doz 40
Underhill's Haines and Bright goods...... $\frac{1}{2}$ doz 40
C. Hammond & Son...... $\frac{1}{2}$ doz 40
Simmons...... $\frac{1}{2}$ doz 40
Pek's...... $\frac{1}{2}$ doz 40
Kelly's...... $\frac{1}{2}$ doz 40
Sargent & Co...... $\frac{1}{2}$ doz 40
Penckley Tool Co...... $\frac{1}{2}$ doz 40
Collins, following list...... $\frac{1}{2}$ doz 40
Shingling, Nos. 1, 2, 3...... $\frac{1}{2}$ doz 40
Claw, Nos. 1, 2, 3...... $\frac{1}{2}$ doz 40
Lathing, Nos. 1, 2, 3...... $\frac{1}{2}$ doz 40

Hay Knives.
Lightning...... $\frac{1}{2}$ doz 115
Electric...... $\frac{1}{2}$ doz 115
Ward's...... $\frac{1}{2}$ doz 115
Carter's Needle...... $\frac{1}{2}$ doz 115
Beath's...... $\frac{1}{2}$ doz 115

Hinges.
Wrought Iron Hinges...... $\frac{1}{2}$ doz 115
Strap and T...... $\frac{1}{2}$ doz 115
Screw Hook and Eye...... $\frac{1}{2}$ doz 115
Strap...... $\frac{1}{2}$ doz 115
Heavy Welded Hook...... $\frac{1}{2}$ doz 115
Claw, Nos. 1, 2, 3...... $\frac{1}{2}$ doz 115
Lathing, Nos. 1, 2, 3...... $\frac{1}{2}$ doz 115

Roller Blind Hinges...... $\frac{1}{2}$ doz 115
Roller Blind Hinges, Nos. 333 and 334...... $\frac{1}{2}$ doz 115
Roller Plate...... $\frac{1}{2}$ doz 115
Roller Raised...... $\frac{1}{2}$ doz 115
Plate Hinges, 8, 10 and 12 in...... $\frac{1}{2}$ doz 115
"Providence" over 12 in...... $\frac{1}{2}$ doz 115

Spring Hinges.
Geer's Spring and Blank Butts...... $\frac{1}{2}$ doz 115
Union Spring Hinge Co.'s list, March, 1886...... $\frac{1}{2}$ doz 115
Acme and U. S...... $\frac{1}{2}$ doz 115
Empire and Crown...... $\frac{1}{2}$ doz 115
Hero and Monarch...... $\frac{1}{2}$ doz 115
American, Gem, and Star, Japanned...... $\frac{1}{2}$ doz 115
American, Gem, and Star, Bronzed...... $\frac{1}{2}$ doz 115
Oxford, Bronze and Brass...... $\frac{1}{2}$ doz 115
Barker's Double Acting...... $\frac{1}{2}$ doz 115
Union Mfg. Co...... $\frac{1}{2}$ doz 115
Bommer's...... $\frac{1}{2}$ doz 115
Blackman's...... $\frac{1}{2}$ doz 115
Chicago...... $\frac{1}{2}$ doz 115

Gate Hinges.
Western...... $\frac{1}{2}$ doz 115
N. E...... $\frac{1}{2}$ doz 115
N. E. Reversible...... $\frac{1}{2}$ doz 115
Clark's, Nos. 1, 2, 3...... $\frac{1}{2}$ doz 115
Star...... $\frac{1}{2}$ doz 115
Automatic...... $\frac{1}{2}$ doz 115
Common...... $\frac{1}{2}$ doz 115
Beymour's...... $\frac{1}{2}$ doz 115
Shepard's...... $\frac{1}{2}$ doz 115
Reed's Latch and Hinges...... $\frac{1}{2}$ doz 115
Parker...... $\frac{1}{2}$ doz 115
Palmer...... $\frac{1}{2}$ doz 115
Beymour...... $\frac{1}{2}$ doz 115
Nicholson...... $\frac{1}{2}$ doz 115
Huffer...... $\frac{1}{2}$ doz 115
Clark's, Nos. 1, 2, 3, 4 and 50...... $\frac{1}{2}$ doz 115
Clark's Mortise Gravity...... $\frac{1}{2}$ doz 115
Sargent's, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24

Silver Lake, Extra White (only)..... 27¢ @ 28¢
 Sylvan Spring, Extra Braided, White..... 34¢
 Sylvan Spring, Extra Braided, Drab..... 39¢
 Semper Idem, Braided, White..... 39¢
 Egyptian, India Hemp, Braided..... 39¢
 Samson, Braided, White Cotton..... 50¢ dis 30 @ 30.85
 Samson, Braided, Drab Cotton..... 55¢ dis 30 @ 30.85
 Samson, Braided Italian Hemp..... 55¢ dis 30 @ 30.85
 Samson Braided Linen..... 50¢ dis 30 @ 30.85

Sash Locks.
 Clark's No. 1, \$10.00; No. 2, \$8.00 $\frac{1}{2}$ gross..... dis 33.50
 Ferguson's..... dis 33.50
 Mason's Triumphant List Aug. 16, 1886..... dis 50.42
 Victor..... 60.42
 Walkers..... 60.42
 Attwell Mfg. Co..... dis 25 @ 31.50
 Reading..... dis 60.54 @ 10 @ 60.54 @ 10.10
 Hammond's Window Springs..... dis 40
 Common Sense, Jap. d. Cop'd and Br'ed. $\frac{1}{2}$ gross \$4.00
 Common Sense, Nickel Plated..... $\frac{1}{2}$ gross \$19.00
 Dunsell's Gravity..... dis 30
 Kemshall's Model..... dis 60.60 @ 10
 Corbin's Daisy, List February 16, 1886..... dis 70
 Payson's Perfect..... dis 60 @ 60.10
 Hugs' Improved Adjustable Sash Bar..... dis 25.87
 Hugs' Improved Adjustable Sash Bar..... 77.15 dis 55.42
 Hugs' Improved Adjustable Sash Bar..... 77.15 dis 55.42
 Stoddard "Practical"..... dis 25.87
 Ives Patent..... dis 90
 Liesche's Nos. 100 & 110 $\frac{1}{2}$ gro. \$5. 105. \$10. dis 20.10
 Davis, Roney, Barnes Mfg. Co..... dis 50
 Chamberlaine Safety, List March 1, 1888..... dis 55.67
 Security..... dis 70

Sash Weights.
 Solid Eyes..... $\frac{1}{2}$ ton \$2

Sausage Stuffers or Fillers.
 Miles' "Challenge"..... $\frac{1}{2}$ doz. \$21, dis 50.60
 Perry..... $\frac{1}{2}$ doz. No. 1, \$15; No. 2, \$20, dis 50.60
 Drew Cut No. 4..... each \$30.00, dis 30
 Butterfield Mfg. Co..... dis 40.10
 Oliver's..... dis 40.10

Saws.
 Diston's Circular..... dis 45.45 & 50
 Diston's Cross Cut, dis 45.45 & 50 } times given by
 Diston's Hand..... dis 25 @ 25.85 } jobbers.
 Atkins' Circular..... dis 50
 Atkins' Silver Steel Diamond X Cuts..... $\frac{1}{2}$ foot 70
 Atkins' Special Steel Dexter X Cuts..... $\frac{1}{2}$ foot 50
 Atkins' Special Steel Diamond X Cuts..... $\frac{1}{2}$ foot 30
 Atkins' Champion and Electric Tooth X Cuts..... $\frac{1}{2}$ foot 27 @ 28
 Atkins' Hollow Back X Cuts..... $\frac{1}{2}$ foot 15
 W. M. & C. Hand..... dis 45
 W. M. & C. Hand..... dis 30.85 @ 30.10
 W. M. & C. Champion X Cuts, Regular $\frac{1}{2}$ foot 24.40
 W. M. & C. X Cuts, Thin Back..... $\frac{1}{2}$ foot 27.75 @ 29
 Peace Circular and Mill..... dis 45.45
 Peace Hand Panel and Rip..... dis 30.10 @ 30.10
 Peace Cross Cut, Standard..... $\frac{1}{2}$ foot 25
 Peace Cross Cut, Standard..... $\frac{1}{2}$ foot 27.75 @ 29
 Richardson's Circular and Mill..... dis 45.45
 Richardson's X-Cuts, No. 1, 39¢; No. 2, 47¢; No. 3, 24¢
 Haws' saws.....
 Griffin's Hack Saws, complete..... dis 40.10 @ 50
 Griffin's Hack Saw, Blades only..... dis 40.10
 Beck's Hack Saws and Blades..... dis 25
 Diamond Hack Saws and Blades..... dis 25
 Eureka and Crescent..... dis 25

Saw Frames.
 White Vermont..... $\frac{1}{2}$ doz \$9 @ \$10
 Red, Polished, and Varnished..... $\frac{1}{2}$ doz \$1.50, dis 25

Saw Sets.
 Stillman's Genuine..... $\frac{1}{2}$ doz \$5.00 and \$7.75, dis 40.85
 Stillman's Genuine..... $\frac{1}{2}$ doz \$5.25 and \$5.25, dis 40.85 @ 10
 Common Lever..... $\frac{1}{2}$ doz \$3.00, dis 40.85
 Morrill's No. 1, \$15.00; Nos. 3 & 4, \$24..... dis 40.10 @ 50
 Leach's..... No. 0, \$8.00; No. 1, \$15.00, dis 15 @ 20
 Nash's..... dis 40.10 @ 50
 Hammer, Hotehicks..... \$5.50, dis 10
 Hammer, Bemis & Call Co.'s new Patent..... dis 30.85
 Bemis & Call Co.'s new Patent and Spring Hammer, dis 30.85
 Bemis & Call Co.'s Plate..... dis 10
 Bemis & Call Co.'s Cross Cut..... dis 12.50
 Aiken's Genuine..... \$13.00, dis 50.10
 Aiken's Imitation..... \$7.00, dis 30.85
 Hart's Patent Lever..... dis 30
 Diston's, Star, $\frac{1}{2}$ No. 15, \$5.50, dis 30.10 @ 30.10
 Diston's, Star, $\frac{1}{2}$ No. 15, \$5.50, dis 30.10 @ 30.10
 Atkins' Criterion..... per doz No. 1, \$6.00, dis 40.10
 Crolasant (Keller), No. 1, \$15.00; No. 2, \$24.00, dis 40.10

Saw Tees.
 Atkins Perfection..... \$15.00; Excelsior \$6.00 $\frac{1}{2}$ doz
 Seneca.....

Scales.
 Hatch, Counter, No. 171, good quality..... $\frac{1}{2}$ doz \$21
 Hatch, No. 161..... $\frac{1}{2}$ doz \$5.75 @ \$7.00
 Union Platform, Plain..... \$2.10 @ \$2.20
 Union Platform, Striped..... \$2.20 @ \$2.30
 Chatillon's Grocers' Trip Scales..... dis 50
 Chatillon's Eureka..... dis 25
 Chatillon's Favorite..... dis 40
 Family Turnbail..... dis 50 @ 30.10
 Rieble Bros..... dis 5

Scales.
 Scale Beams, List of Jan. 13, 22, dis 50.10 @ 50.10
 Chatillon's No. 1..... dis 40
 Chatillon's No. 2..... dis 60

Scrapers.
 Adjustable Box Scraper (S. R. & L. Co.), \$6.50, dis 30.10
 Box, 1 Handle..... $\frac{1}{2}$ doz \$4.00, dis 10
 Box, 2 Handle..... $\frac{1}{2}$ doz \$6.00, dis 10
 Foot..... dis 50.10 @ 60
 Ship, Common..... dis 35.50
 Ship, Providence Tool Co..... dis 10

Screen Window and Door Frames.
 Porter's Pat. Window and Door Frame..... dis 33.10
 Screen Corner Irons, Warner's..... dis 33.10 @ 33.10
 Screen Corner Irons, Warner's..... dis 25 @ 25.10

Shovel Drivers.
 Douglas Mfg. Co..... dis 30.10 @ 10
 Diston's..... dis 45.45
 Diston's Patent Excelsior..... dis 45.45
 Stanley R. & L. Co.'s Varnished Handle..... dis 55.10
 Stanley R. & L. Co.'s Black Handles..... dis 60.10
 Sargent & Co.'s No. 1 Forged Blade..... dis 60.10 @ 10
 Sargent & Co.'s Nos. 20, 40 and 60..... dis 60.10 @ 10
 Knapp & Cowles' No. 1..... dis 60.10 @ 70
 Knapp & Cowles' No. 1 Extra..... dis 60 @ 60.10
 Knapp & Cowles' No. 00 & 4..... dis 50.25 @ 50.10
 Gay & Paton..... dis 35
 Champion..... dis 25 @ 10
 Clark's Patent..... dis 30 @ 33.10
 Crawford's Adjustable..... dis 30
 Elrich's Patent and Hatchet..... dis 25 @ 25.10
 Gay & Paton, new list..... dis 25
 Kolb's Common Sense..... $\frac{1}{2}$ doz \$6, dis 25 @ 10
 Syracuse Screw-Drive Bits..... dis 30 @ 30.45
 Screw Driver Bits..... $\frac{1}{2}$ doz, 50¢ @ 75¢
 Screw Driver Bits, Farr's..... $\frac{1}{2}$ gro 6.25
 Fry & Hol, Hole, Steel, No. 3, \$12..... dis. 25 @ 25 @ 10
 Fry & Co.'s, all steel..... dis 50

Screws.
 Wood Screws—List, Brass, Jan 27; Iron, July 1, 1887
 Flat Head Iron..... dis 70
 Round Head Iron..... dis 65
 Flat Head Brass..... dis 65
 Round Head Brass..... dis 60
 Round Head Brass..... dis 60
 Round Head Bronze..... dis 60

Ex. 10 often given by jobbers.

[illegible]

CURRENT METAL PRICES.

NOVEMBER 7, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
3/4 to 2 in. round and square..	per lb 1.90 @ 2.00¢
1 to 6 in. x 3/4 to 1 in.	per lb 2.10 @ 2.2¢
Refined Iron:	
3/4 to 2 in. round and square..	per lb 2.30 @ 2.4¢
1 to 6 in. x 3/4 to 1 in.	per lb 2.30 @ 2.4¢
Rods—5/8 and 1-1/2 round and sq..	per lb 2.30 @ 2.4¢
Bands—1 to 6 x 3-16 to No. 12....	per lb 2.30 @ 2.4¢
"Burden Best" Iron, base price..	per lb 3.00 @ ...¢
Burden's "H. B. & S." Iron, base price..	per lb 2.80 @ ...¢
"Ulster"	per lb 3.10 @ ...¢
Norway Rods	per lb 4.00 @ 5.00¢

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery.	
Toe Calk, Tire and Sleigh Shoe, base price in small lots....	3 1/2¢ @ 3¢
Best Cast Steel, base price in small lots....	8 1/2¢ @ 9 1/2¢
Best Cast Steel Machinery, base price in small lots....	5 1/2¢ @ 6¢
For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see <i>The Iron Age</i> , June 21, 1888.	

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16.....	per lb 2.75 @ 2.80¢
17 to 20.....	per lb 2.85 @ 3.00¢
21 to 24.....	per lb 3.00 @ 3.10¢
25 and 26.....	per lb 3.20 @ 3.50¢
27.....	per lb 3.35 @ 3.75¢
28.....	per lb 3.50 @ 4.00¢
B. B.	2d qual.
Galv'd, 14 to 20, per lb 4.50 @ 4.38¢	
Galv'd, 21 to 24, per lb 4.87 1/2 @ 4.75¢	
Galv'd, 25 to 26, per lb 5.25 @ 5.12¢	
Galv'd, 27.....	per lb 5.62 1/2 @ 5.48¢
Galv'd, 28.....	per lb 6.00 @ 5.85¢
Patent Planished.....	per lb A 10¢ B, 9¢
Russia.....	per lb 9 1/2¢ @ 10¢
American Cold Rolled B. B.	per lb 5¢ @ 7¢

English Steel from Store.

Best Cast.....	per lb 15¢
Extra Cast.....	per lb 16 1/2¢
Swaged, Cast.....	per lb 16¢
Best Double Shear.....	per lb 15¢
Blister, 1st quality.....	per lb 12 1/2¢
German Steel, Best.....	per lb 10¢
3d quality.....	per lb 9¢
3d quality.....	per lb 8¢
Sheet Cast Steel, 1st quality.....	per lb 15¢
2d quality.....	per lb 14¢
3d quality.....	per lb 12 1/2¢

METALS.

Tin.

Banca, Pigs.....	per lb 25¢
Straits, Pigs.....	per lb 25¢
English, Pigs.....	per lb 24 1/2¢
Straits in Bars.....	per lb 26¢

Tin Plates.

Charcoal Plates.—Bright.	Per box.
Melyn Grade.....	per box \$6.00 @ \$6.25
IC, 10 x 14.....	per box 6.25 @ 6.50
IC, 12 x 13.....	per box 6.00 @ 6.25
IC, 14 x 20.....	per box 12.50 @ 13.00
IX, 10 x 14.....	per box 7.50 @ 7.75
IX, 12 x 12.....	per box 7.75 @ 8.00
IX, 14 x 20.....	per box 7.50 @ 7.75
IX, 20 x 28.....	per box 15.50 @ 16.00
DC, 12 1/2 x 17.....	per box 7.50 @ 8.00
DX, 12 1/2 x 17.....	per box 7.25 @ 7.50
Call and Grade.....	per box 6.00 @ 6.25
IC, 12 x 12.....	per box 6.25 @ 6.50
IC, 14 x 20.....	per box 6.00 @ 6.25
IX, 10 x 14.....	per box 7.50 @ 7.75
IX, 12 x 12.....	per box 7.75 @ 8.00
IX, 14 x 20.....	per box 7.50 @ 7.75
Ataway Grade.....	per box \$5.37 1/2 @ ..
IC, 12 x 12.....	per box 5.50 @ ..
IC, 14 x 20.....	per box 5.87 1/2 @ ..
IX, 20 x 28.....	per box 11.50 @ ..
IX, 10 x 14.....	per box 6.25 @ ..
IX, 12 x 12.....	per box 6.50 @ ..
IX, 14 x 20.....	per box 6.25 @ ..
IX, 20 x 28.....	per box 13.00 @ ..
DC, 12 1/2 x 17.....	per box .00 @ ..
DX, 12 1/2 x 17.....	per box 6.00 @ ..

Coke Plates.—Bright.

Steel Coke.—IC, 10 x 14, 14 x 20.....	per box \$5.00 @ ..
10 x 20.....	per box 7.50 @ 7.65
20 x 28.....	per box 10.25 @ ..
IX, 10 x 14, 14 x 20.....	per box 5.75 @ ..
EV Grade.—IC, 10 x 14, 14 x 20.....	per box 4.60 @ ..

Charcoal Plates.—Terne.

Lean Grade.—IC, 14 x 20.....	per box \$4.62 1/2 @ ..
20 x 28.....	per box 9.25 @ ..
IX, 14 x 20.....	per box 5.62 1/2 @ ..
20 x 28.....	per box 11.37 1/2 @ ..
Abecarne Grade.—IC, 14 x 20.....	per box 4.50 @ ..
20 x 28.....	per box 9.00 @ ..
IX, 14 x 20.....	per box 5.50 @ ..
20 x 28.....	per box 10.80 @ ..

Tin Boiler Plates.

1XX, 14 x 26.....	112 sheets.....	\$12.50 @ \$12.75
1XX, 14 x 28.....	112 sheets.....	12.75 @ ..
1XX, 14 x 31.....	112 sheets.....	14.25 @ ..

Copper.

Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢ per lb. Manufactured (including all articles of which Copper is a component of chief value), 45 ¢ ad valorem.	
Ingot.....	per lb 18 1/2¢
"Anchor" Brand.....	per lb 18 ¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

			Weights per square foot and prices per pound.							
Not wider than	Not longer than	And longer than	Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30.....	72.....	25.....	25.....	25.....	25.....	26.....	27.....	28.....	31.....	33.....
30.....	72.....	25.....	25.....	25.....	25.....	26.....	27.....	28.....	30.....	34.....
36.....	96.....	25.....	25.....	25.....	25.....	27.....	29.....	31.....	33.....	36.....
36.....	96.....	25.....	25.....	25.....	25.....	27.....	29.....	31.....	33.....	36.....
48.....	96.....	25.....	25.....	25.....	25.....	27.....	29.....	31.....	33.....	36.....
48.....	96.....	25.....	25.....	25.....	25.....	27.....	29.....	31.....	33.....	36.....
60.....	96.....	25.....	25.....	25.....	25.....	30.....	32.....	37.....	.....	.....
60.....	96.....	25.....	25.....	25.....	25.....	30.....	32.....	37.....	.....	.....
84.....	96.....	26.....	27.....	.....	.....	.....	.....	.....	.....	.....
84.....	96.....	27.....	28.....	.....	.....	.....	.....	.....	.....	.....
Over 84 in. wide	28.....	30.....	.....	.....	.....	.....	.....	.....	.....	.....

All Bath Tub Sheets..... 16 oz. 14 oz. 12 oz. 10 oz.
Per pound..... \$0.58 0.30 0.32 0.35

Bolt Copper, 3/4 inch diameter and over, per pound..... 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

Per pound.

14 ounce to square foot and heavier..... 28¢

12 ounce and up to 14 ounce to square foot..... 29¢

10 ounce and up to 12 ounce..... 31¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each..... 8¢

Tinning sheets on one side, 30 x 60 each..... 30¢

For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each..... 15¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each..... 12¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each..... 12¢

Tinning sheets on one side, other sizes, per square foot..... 2 1/2¢

For tinning both sides double the above prices.

Planished Copper.

Planished Copper List May 5, 1888..... Net

Brass and Copper Tubes.

Seamless Copper..... 50¢

Seamless Brass..... 47¢

3/4 inch per lb..... 44¢

1/2 inch per lb..... 42¢

3/8 inch per lb..... 40¢

1/4 inch per lb..... 38¢

1/8 inch per lb..... 36¢

1/16 inch per lb..... 34¢

1/32 inch per lb..... 32¢

Roll and Sheet Brass.

Discount from list..... 10 @ 15 %

Spelter.

Duty: Pig, Bars and Plates, \$1.50 per 100 lb.

Western Spelter..... 5 1/2¢ @ 6¢

"Bergenport"..... 5 1/2¢ @ 6¢

"Bertha"..... 7 1/4 @ 8¢

Zinc.

Duty: Sheet, 2 1/2¢ per lb.

600 lb casks..... 6 1/2¢

Per lb..... 7 1/2¢

Lead.

Duty: Pig, \$2 per 100 lb. Old Lead, 2¢ per lb. Pipe and Sheets, 3¢ per lb.

American..... 4 1/4 @ 4 1/2¢

Newark..... 4 1/4 @ 4 1/2¢

Bar..... 5 1/2¢ @ ..

Pipe, subject to trade discount..... 7 1/2¢

Tin-Lined Pipe, subject to trade discount..... 15¢

Block Tin Pipes, subject to trade discount..... 45¢

Sheet, subject to trade discount..... 8 1/2¢

Solder.

1/2 (Guaranteed)..... 16¢

Extra Wiping..... 13 1/2¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson..... per lb 13 1/2 @ 14¢

Hallett's..... 11 1/2¢

Plumbers' Brass Work.

Discount per cent.

Ground Bibbs and Stops..... 55¢ 10¢ 2

Ground Stops, Hydrant Cocks, &c..... 55¢ 10¢ 2

Corporation Cocks..... 55¢ 10¢ 2

Corporation Cocks, "Mueller" Pattern, from Western list..... 55¢ 10¢ 2

Ground Basin and Shampooing Cocks..... 50¢ 10¢ 2

Compression Basin Cocks..... 50¢ 10¢ 2

Compression Basin and Sink Cocks..... 50¢ 10¢ 2

Compression Pantry Cocks..... 50¢ 10¢ 2

Compression Double Basin and Shampooing Cocks..... 50¢ 10¢ 2

Compression Double Bath Cocks..... 50¢ 10¢ 2

Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks..... 50¢ 10¢ 2

Basin Plugs and Basin Grates..... 55¢ 10¢ 2

Bath and Wash Tray Plugs..... 55¢ 10¢ 2

Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets..... 55¢ 10¢ 2

Basin Clamps, Basin Joints and Strainers 55¢ 10¢ 2

Boiler Couplings, Ground Face, per set \$1.25..... 10

Boiler Couplings, Plain Face, per set \$1.20..... 10

Water Back Valve and Plain Couplings, Soldering Nipples and Unions..... 55¢ 10¢ 2

Union Joints..... 60¢ 10¢ 2

Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides..... 55¢ 10¢ 2

Hose Goods..... 55¢ 10¢ 2

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.

Brass Globe Valves..... 60¢ 10¢ 2

Finish'd Brass Globe Valves, with Finish'd Brass Wheels..... 60¢ 10¢ 2

Brass Globe Valves, with Patent Wood Wheels..... 60¢ 10¢ 2

Brass Globe Angle and Corner Valves..... 60¢ 10¢ 2

Brass Radiator Angle Valves..... 60¢ 10¢ 2

Brass Radiator Angle Valves, Frink's Patent..... 60¢ 10¢ 2

Brass Cross and Check Valves..... 60¢ 10¢ 2

Brass Check Valves..... 60¢ 10¢ 2

Brass Hose Valves..... 60¢ 10¢ 2

Brass and Iron Frink Valves..... 60¢ 10¢ 2

Brass Safety Valves..... 50¢ 10¢ 2

Brass Vacuum Valves..... 50¢ 10¢ 2

Brass Whistle Valves..... 60¢ 10¢ 2

Brass Balance, Back Pressure and Foot Valves..... 50¢ 10¢ 2

Brass Butterfly and Throttle Valves..... 50¢ 10¢ 2

Brass Pump Valves..... 50¢ 10¢ 2

Brass Steam Cocks..... 57 1/2¢ 10¢ 2

Brass Service, Meter and Union Meter Cocks..... 57 1/2¢ 10¢ 2

Brass Whistles, Water Gauges and Oil Cups..... 60¢ 10¢ 2

Brass Hollow Plug, Tallow and Globe Oil Cups..... 50¢ 10¢ 2

Brass Lubricators..... 60¢ 10¢ 2

Brass Air Valves..... 60¢ 10¢ 2

Brass Air Cocks..... 60¢ 10¢ 2

Brass Gauge Cocks..... 55¢ 10¢ 2

Brass Cylinder Cocks and Steam Bibbs..... 50¢ 10¢ 2

Brass Swing Joints and Expansion Joints..... 50¢ 10¢ 2

Brass Test Pumps..... 50¢ 10¢ 2

Brass Steam Fittings, Rough..... 60¢ 10¢ 2

Brass Steam Fittings, Finished..... 20¢ 10¢ 2

Brass Union Joints..... 60¢ 10¢ 2

Brass Soldering Unions and Nipples..... 55¢ 10¢ 2

Brass Hose Fittings, Fusible and Boiler Plugs..... 55¢ 10¢ 2

Iron Body Globe, Angie, Cross and Check Valves..... 60¢ 10¢ 2

Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves..... 60¢ 10¢ 2

Iron Cocks, all Iron..... 65¢ 10¢ 2

All Iron Valves..... 65¢ 10¢ 2

Miscellaneous.

Discount per cent.

Cast Iron Fittings